A REVISION OF THE PARASITIC WASPS OF THE SUBFAMILY BRACONINAE OCCURRING IN AMERICA NORTH OF MEXICO

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INTRODUCTION

It was shown by Viereck[1] that *Cremnops* Foerster (1862), a genus of Agathidinae, is isogenotypic with *Bracon* Fabricius (1804), and must therefore be suppressed as a synonym. Since, under the rules of nomenclature, one of the subfamily names must be based on the same generic name as that on which the name of the family is founded, it became necessary to replace Agathidinae of Authors with the subfamily name Braconinae. This change has been published by Gahan.[2]

The following pages present the results of a detailed study of the Braconinae of America north of Mexico, with the purpose of facilitating the identification of the species occurring in this region. The Nearctic species of the genus *Bracon* Fabricius (*Cremnops* Foerster) have been comparatively recently studied and classified by Morrison,[3] and a treatment of *Bracon* therefore will be omitted from this paper, except for the description of a single new species. There are many world genera that have been assigned to this subfamily which are not known to occur in our fauna. These have been omitted from even the generic key, because it is impossible to determine what most of them are without access to the genotypes, and their inclusion would almost certainly increase the difficulty of recognizing our known genera in the key.

The collection of Braconinae in the United States National Museum has served as a basis for this revision. In addition, I have had the opportunity of studying the types in the Philadelphia Academy of Science, those in the University of Kansas, and those at the State agricultural experiment station in New Haven, Connecticut. I have also seen certain material from the collections of the University of Illinois and the Boston Society of Natural History.

[1] Bull. 83, U. S. Nat. Mus., 1914, pp. 23 and 37.
[2] Proc. U. S. Nat. Mus., vol. 53, 1917, p. 197.
[3] Idem, vol. 52, 1917, pp. 305-343.

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This paper is a contribution from the division of gipsy moth and brown-tail moth investigations of the Bureau of Entomology. I am indebted to A. F. Burgess, in charge of this division for making the study possible. At this point I also wish to express my thanks to Dr. Henry Skinner, of the Philadelphia Academy of Science, Dr. W. E. Britton, of the Connecticut Agricultural Experiment Station, and Dr. H. B. Hungerford, of the University of Kansas, for permission to examine types in their custody, and to Dr. T. H Frison, of the University of Illinois, and C. W. Johnson, of the Boston Society of Natural History, for the loan of specimens. S. A. Rohwer and A. B. Gahan, of the division of taxonomic investigations, United States Bureau of Entomology, have allowed me the use of certain of their notes and have contributed many valuable suggestions.

CLASSIFICATION

Superfamily ICHNEUMONOIDEA

Family BRACONIDAE

Subfamily BRACONINAE

Agathidoidae FOERSTER, Verh. naturh. Ver. preuss. Rheinl., vol. 19, 1862, pp 228 and 245.

Eumicrodoidae FOERSTER, Verh. naturh. Ver. preuss. Rheinl., vol. 19, 1862, pp. 228 and 246.

Agathidides MARSHALL, Trans. Ent. Soc. London, 1885, pp. 10 and 261.

Agathidinae CRESSON, Syn. Hymen. N. Amer., 1887, pp. 55 and 59.

Agathidinae, ASHMEAD, Proc. U. S. Nat. Mus., vol. 23, 1900, p. 127.

Agathinae SZEPLIGETI, Genera Insectorum, fasc. 22, 1904, p. 115.

Foerster made two distinct families of this group, basing his division solely upon the shape of the head. Marshall, however, considered Foerster's Agathidoidae and Eumicrodoidae so essentially similar that he combined them under the name "Agathidides." Ashmead, although appreciating the extremely close relationship between the two families, nevertheless held them distinct as the tribes Agathidini and Microdini, respectively, of his subfamily Agathidinae. A little later Szepligeti again combined these in a single group which he called the Agathinae. In my opinion it is altogether impossible to divide the subfamily on the basis of the shape of the head. In fact, the study of a large quantity of material has compelled me to synonymize *Agathis* Latreille, which is representative of Foerster's Agathidoidae, with *Bassus* Fabricius (= *Microdus* Nees), the typical genus of his Eumicrodoidae. This will be discussed in more detail in the treatment of the genus *Bassus*.

Because of certain superficial resemblances Foerster placed *Orgilus* Haliday in his Eumicrodoidae. On the basis of its margined occiput Ashmead removed the genus to the Blacinae; but Szepligeti still

later followed Foerster and Marshall and placed it in his Agathinae. Even more recently Lyle[4] has retained *Orgilus* in this group. The margined or immargined condition of the occiput is one of the most dependable subfamily characters in the Braconidae, and the margined occiput of *Orgilus*, combined with the open second cubital cell and the broader radial cell, seems to me to necessitate the exclusion of the genus from this subfamily. Accordingly, it is omitted from the Braconinae as treated in this paper. Szepligeti also incorrectly included *Plumarius* Phillippi and *Neoneurus* Haliday. The former of these has been shown by Bradley[5] to belong in the Mutillidae; and Bengtsson[6] has properly established the subfamily Neoneurinae for the reception of *Neoneurus* and *Elasmosoma* Ruthe. *Meteoridea*

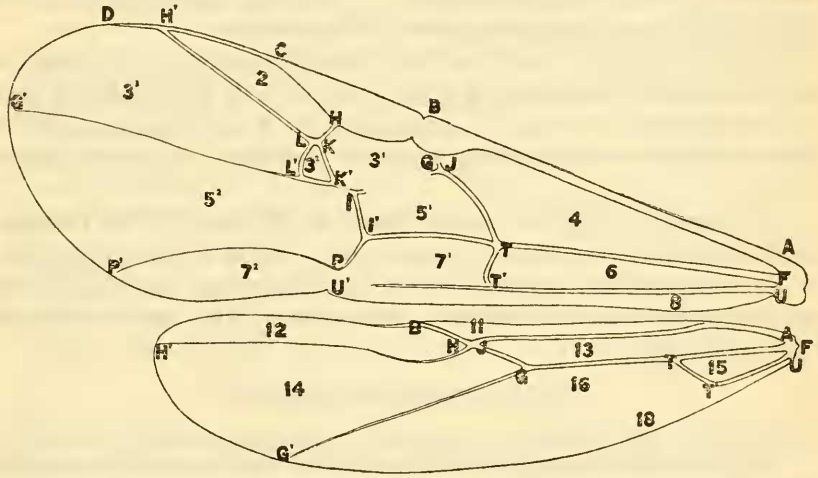

FIG. 1.—WINGS OF BASSUS SANCTUS SAY.

VEINS.—ANTERIOR WING: AB=COSTA; BC=STIGMA; CH'D=METACARPUS; HKH'=RADIUS; GK'G'=CUBITUS FT=MEDIUS; TI'P=DISCOIDEUS; PP'=SUBDISCOIDEUS; UT'=SUBMEDIUS; T'U'=BRACHIUS; JT=BASAL VEIN; KK'=1ST INTERCUBITUS; LL'=2D INTERCUBITUS; II'=RECURRENT VEIN; TT'=NERVULUS.

POSTERIOR WING: AJB=SUBCOSTELLA; HH'=RADIELLA; GG'=CUBITELLA; FT=1ST ABSCISSA OF MEDIELLA; TG=2D ABSCISSA OF MEDIELLA; UT'=SUBMEDIELLA; JG=BASELLA; TT'=NERVELLUS.

CELLS.—2=RADIAL CELL; 3=CUBITAL CELLS; 4=MEDIAN CELL; 5=DISCOIDAL CELLS; 6=SUBMEDIAN CELL; 7=BRACHIAL CELLS; 8=ANAL CELL; 11=COSTELLAN CELL; 12=RADIELLAN CELL; 13=MEDIELLAN CELL; 14=CUBITELLAN CELL; 15=SUBMEDIELLAN CELL; 16=DISCOIDELLAN CELL; 18=BRACHIELLAN CELL.

Ashmead was placed by its author in his Agathidinae, but it clearly does not belong there, being evidently a Diospiline.

The following combination of characters will distinguish members of the Braconinae: Head transverse; face sometimes much lengthened; eyes bare or practically so; maxillary palpi five-segmented; labial palpi usually four-segmented; no opening between clypeus and

[4]The Entomologist, vol. 53, 1920, p. 177.
[5]Journ. Wash. Acad. Sci., vol. 11, 1921, p. 214.
[6]Lund. Univ. Arsskr., n. f., Avd. 2, vol. 14, 1918, p. 1.

mandibles; the labrum nearly always conspicuous and filling the space between clypeus and mandibles; labium sometimes extented; occiput immargined; parapsidal furrows usually, though not always, impressed; prepectal carina usually very distinct; first cubital and first discoidal cells nearly always confluent (in the Nearctic forms separated only in *Earinus*); radial cell always exceptionally narrow and ending far before apex of wing, always complete; the radius strong and distinct to the wing margin; second cubital cell small, triangular, subtriangular or subquadrate, sessile or petiolate complete, both intercubiti being present; mediella straight, the second abscissa on a line with the first; submediellan cell varying in length; abdomen usually sessile, rarely subpetiolate; ovipositor varying from not exserted to longer than the body. The wing characters alone will practically always indicate species of Braconinae.

In order to prevent any possible misunderstanding with regard to the terms used in designating wing characters in the following keys and descriptions, a detailed explanation of wing veins and cells is given below the accompanying figure of the wings of *Bassus sanctus* Say.

Comparatively little is known regarding the specific host relationships of the various species of Braconinae. Most of the species, however, are undoubtedly parasitic on lepidopterous larvae, although some appear to attack certain coleopterous borers in the stems of herbaceous plants.

KEY TO THE NEARCTIC GENERA OF BRACONINAE

1. First cubital cell completely separated from the first discoidal; second cubital cell quadrate or subquadrate, broadly sessile; parapsidal furrows wanting; tarsal claws with a large basal tooth; ovipositor sheaths unusually broad and densely hairy ..... Earinus Wesmael.
   First cubital cell confluent with the first discoidal ..... 2.
2. Tarsal claws, at least those of the anterior legs, distinctly cleft; second cubital cell quadrate or subquadrate sessile; the second abscissa of radius usually much longer than the first—if not, then the apical segment of posterior trochanters strongly carinately margined beneath on the outer side; frons margined laterally by a distinct carina or ridge; propodeum coarsely aerolated; abdomen always completely polished ..... 3.
   Tarsal claws simple or with a broad basal tooth, never cleft; areolet usually triangular or subtriangular, the second abscissa of radius rarely distinct and then very short; apical segment of posterior trochanters never carinate beneath; frons usually immargined; sculpture of propodeum and abdomen variable ..... 4.
3. Face not rostriform; the eyes unusualy large, the malar space very short, rarely one-fourth as long as the eyes; apical segment of posterior trochanters distinctly carinately margined beneath on the outer side; inner spur of hind tibia much more than half as long as the posterior basitarsus; scutellum distinctly margined at apex; scape of antennae unusually large and much longer than the first flagellar segment; ovipositor sheaths shorter than the first abdominal tergite ..... Zelomorpha Ashmead.

Face elongate; rostriform; the malar space varying from a little shorter to a little longer than the eyes; apical segment of posterior trochanters not carinately margined beneath; tibial spurs shorter; scutellum not margined at apex; ovipositor sheaths about as long as the abdomen or nearly.

Braeon Fabricius.

4. Maxillary palpi modified to form a long 5-segmented hollow beak that is usually as long as the head and thorax combined; tarsal claws simple, or with an indistinct basal tooth; basal abdominal tergites sculptured; ovipositor long ..... **Aenigmostomus** Ashmead.

Maxillary palpi normal, not modified to form a long beak ..... 5.

5. Posterior basitarsus more or less incrassate, sometimes very broad; apical segment of all tarsi very large and long; the apical segment of hind tarsi usually fully as long as the second segment; tarsal claws large and with a distinct basal tooth; labium usually conspicously extended; wings varying from yellow to practically hyaline, with the area covered by the third cubital, second discoidal, and second brachial cells, contrastingly dusky; propodeum short and broad, fully twice as broad as long down the middle; ovipositor sheaths varying from as long as the first abdominal tergite to as long as the abdomen ..... **Agathirsia** Westwood.

Posterior basitarsus not incrassate; otherwise not combining the above characters ..... 6.

6. Ovipositor barely exserted and strongly decurved; tarsal claws large, simple, with no indication of a basal tooth; abdomen completely polished with no suggestion of sculpture; propodeum closely rugose, not areolated.

Crassomicrodus Ashmead.

Ovipositor always prominent, the sheaths at least as long as the abdomen; tarsal claws with a basal tooth, which is usually very pronounced, very rarely without a distinct basal tooth (*brevicornis*), but then the abdomen more or less sculptured at base and the propodeum not closely rugose.

Bassus Fabricius.

Genus EARINUS Wesmael

Earinus WESMAEL, Nouv. Mem. Acad. Sci. Brux., vol. 10, 1837, p. 8. *Genotype.*—(*Microdus gloriator* Nees) = *Bassus gloriatorius* Panzer (Monobasic).

Diatmetus FOERSTER, Verh. naturh. Ver. preuss. Rheinl., vol. 19, 1862, p. 246. *Genotype.*—(*Microdus gloriator* Nees) = *Bassus gloriatorius* Panzer (Monobasic). Isogenotypic with *Earinus* Wesmael.

The most conspicuous difference between this genus and all other genera of the Braconinae which are represented in the Nearctic fauna, is the complete separation of the first cubital and first discoidal cells. But, in addition to this, *Earinus* exhibits a combination of characters not found in the genus *Bassus*, to which it is most closely allied.

Head transverse, somewhat hollowed out behind; face not rostriform, much broader than long from the antennal foramina to the apex of clypeus, with long abundant whitish pile; clypeus broad; mandibles large, crossing at tips, bidentate, the inner tooth much shorter than the outer and truncate; palpi normal, the maxillary palpi 5-segmented, the labial 4-segmented; labium not extended; eyes large, malar space much less than half the eye height; frontal impressions not margined by carinae; all three ocelli situated on the vertex, the median ocellus not distinctly below the others; parapsidal

furrows wanting; mesopleural furrow represented by a shallow polished impression; propodeum rounded; its entire apical margin sharply carinate and conspicuously elevated; propodeal spiracles small, nearly circular; wings hyaline; first cubital and first discoidal cells completely separated; second cubital cell quadrate, the second abscissa of radius always distinct and usually longer than the first; legs moderately long; inner spur of hind tibiae a little less than half the metatarsus; tarsal claws with a tooth at base; abdomen broadly sessile, depressed, rather slender, the middle segments only slightly widened; ovipositor prominent; the sheaths exceptionally broad, and densely hairy.

Only one species has been found in our fauna.

EARINUS LIMITARIS (Say)

Bassus limitaris SAY, Boston Journ. Nat. Hist., vol. 1, p. 250.
Earinus limitaris CRESSON, Canad. Ent., vol. 5, 1873, p. 54.

Type.—Lost.

The following characters added to the foregoing generic description will distinguish this species: Face usually rather evenly punctate, slightly elevated down the median line; temples moderately broad but receding; cheeks bulging a little; ocell-ocular line not or only slightly longer than twice the diameter of an ocellus and hardly as long as postocellar line; the ocellar area a little elevated above the rest of the vertex; antennae usually 35 to 40 segmented, the flagellum tapering somewhat to the apex; all the segments longer than broad; mesoscutum weakly punctate; propodeum mostly smooth, usually with two more or less distinct median carinae that diverge slightly behind; pleura and propodeum covered with abundant, long, grayish pile; radius usually arising distinctly before middle of stigma, but varying somewhat in this respect, occasionally coming from the middle of stigma; second cubital cell usually about as long as high, with the second abscissa of radius longer than the first and the second intercubitus angled outwardly; but there is considerable variation in this, the second abscissa of radius being sometimes no longer than the first and the second intercubitus not always angled; nervulus interstitial with basal vein, or nearly; first abscissa of mediella longer than the second; nervellus angled and emitting a distinct discoidella; anterior femora somewhat swollen; posterior femora, tibiae, and tarsi rather long and slender; abdomen flat above, nearly parallel-sided, narrowed only a little basally and apically; first tergite slightly roughened, usually with two prominent dorsal keels that converge slightly behind; ovipositor sheaths very broad, strongly hairy and about as long as the abdomen. Body entirely black; wings hyaline or very faintly dusky; legs, including coxae, testaceous; the anterior coxae sometimes blackish at base; the posterior tibiae usually yellow-

ish white, with a small, often incomplete, blackish annulus a short distance from the base and with nearly the apical half black; the color of the posterior tibiae varies somewhat, however; sometimes the broad apical band is red on the inner surface, and, very rarely, the hind tibiae are entirely reddish apically and lack a distinct blackish spot or band near the base; all intergrades occur; posterior tarsi blackish.

There is a considerable number of specimens of this species in the United States National Museum from various localities in New York, Ohio, Michigan, Maryland, Virginia, New Hampshire, Colorado, Nevada, California, and Canada. I have also seen several specimens from Illinois in the collection of the University of Illinois.

The host relationships of the species are not known.

Genus ZELOMORPHA Ashmead

Neophylax ASHMEAD (not McLachlan), Proc. U. S. Nat. Mus., vol. 23, 1900, p. 119. *Genotype.—Neophylax snyderi* Ashmead (Monobasic).

Zelomorpha Ashmead, Proc. U. S. Nat. Mus., vol. 23, 1900, p. 126. *Genotype.—Zelomorpha arizonensis* Ashmead (Monobasic).

Caenophylax SCHULZ (=*Neophylax* Ashmead preoccupied), Zool. Ann., 1911, p. 88.

Zelomorphidea VIERECK, Proc. U. S. Nat. Mus., vol. 42, 1912, p. 630. *Genotype.—Zelomorpha* (*Zelomorphidea*) *melanota* Viereck (Monobasic).

Neophylax Ashmead has page precedence over *Zelomorpha,* but, as has been shown by Schulz, it is preoccupied by *Neophylax* McLachan (1871). Schulz proposed *Caenophylax* for *Neophylax* Ashmead, but this name is unnecessary since *Zelomorpha,* a synonym of *Neophylax* Ashmead, is available. In his list of the genotypes of the Ichneumonoidea[7] Viereck synonymized *Neophylax* with *Euagathis* Szepligeti, apparently, however, without having seen the genotype of the latter. If this synonymy is correct *Zelomorpha* must be suppressed as a synonym of *Euagathis,* which has priority. But, although the two genera seem to be closely related, certain characters, particularly the immargined frons and the completely margined scutellum, which Szepligeti originally ascribed to *Euagathis,* do not hold for *Zelomorpha,* and some of the most striking characters of the latter genus, the carinately margined apical segment of the posterior trochanters, the large eyes, and the exceptionally long tibial spurs, are not mentioned by Szepligeti for *Euagathis.* Consequently I think it unwise to accept Viereck's synonymy without first seeing the genotype of *Euagathis,* and I shall therefore retain *Zelomorpha* as a good genus.

The following characters apply to this genus as it is known at present: Head transverse, about as broad as long, not at all rostriform; palpi slender, the maxillary palpi 5-segmented, the labial 4-seg-

[7] Bull. 83, U. S. Nat. Mus., 1914, p. 100.

mented; eyes very large and prominent, the malar space short; temples unusually narrow and strongly receding; two more or less prominent elevations between antennae; frons margined by carinae; ocelli very large; antennae rather long, the scape exceptionally large, much longer than the first flagellar segment; parapsidal furrows impressed; scutellum margined at apex; propodeum areolated; propodeal spiracles large, slitlike; apical segment of the posterior trochanters carinately margined beneath on the outer side; tibial spurs very long; tarsi slender, the apical segment of all tarsi long; the claws cleft; first cubital and first discoidal cells confluent; second cubital cell small, subquadrate, narrowed above; the second intercubitus angled outwardly; radiellan cell narrower than usual; submediellan cell very short; abdomen narrow, somewhat compressed apically in the female, entirely polished; ovipositor sheaths shorter than the first abdominal tergite. Color usually ferruginous.

Only a single species of this interesting genus occurs in our fauna.

ZELOMORPHA ARIZONENSIS Ashmead

Zelomorpha arizonensis ASHMEAD, Proc. U. S. Nat. Mus., vol. 23, 1900, p. 129.

Since Ashmead did not describe this species, except as it was characterized in his generic key, a rather full description is given here.

Length usually 7–8 mm.; head strongly transverse; face smooth, temples and cheeks very narrow; eyes very large, weakly emarginate opposite the insertion of antennae; malar space very short; scarcely as long as the basal width of mandibles; palpi normal; frons rather sharply margined laterally; ocelli especially large, the ocell-ocular line distinctly shorter than the diameter of a lateral ocellus; antennae usually 40 to 45 segmented, tapering to the tip; scape very large, subcylindrical, obliquely truncate at apex, much longer than the first flagellar segment; pedicel transverse, very short; thorax moderately stout; parapsidal furrows impressed, but the mesonotal lobes not very prominent; the middle lobe shallowly impressed medially; furrow in front of scutellum broad, deep, and usually with several distinctly separated pits; scutellum slightly convex, broadly truncate at apex, where it is margined by a distinct carina; propodeum short, rather gradually declivous, with about twelve sharply delimited areas that are smooth within; usually five distinctly separated areas behind the prominent apical transverse carina; propodeal spiracles large, rather slitlike; pleura polished; mesopleural furrow smooth or weakly foveolate; posterior coxae rather long, punctate; femora, tibiae, and tarsi rather slender; apical segment of hind trochanters sharply carinately margined below; inner spur of middle tibia about as long as the middle basitarsus; inner spur of hind tibia much longer than the outer and also much longer than

half the posterior basitarsus; apical segment of hind tarsi about as long as the second tarsal segment; claws distinctly cleft; radius arising from a little before middle of stigma; radial cell rather long, but very narrow; second cubital cell subquadrate, narrowed above; the second intercubitus usually strongly angled outwardly; medius obsolescent basally; nervulus usually a little antefurcal; submediellan cell very short, the first abscissa of mediella much shorter than the second; abdomen not longer than head and thorax combined, rather narrow, somewhat compressed apically, entirely polished; ovipositor sheaths distinctly exserted, but considerably shorter than the first abdominal tergite. Color, uniformly ferruginous; antennae blackish; legs concolorous with the body, the posterior tarsi more or less dusky; wings hyaline.

The above description is based on the following material, which is in the United States National Museum: One specimen from Arizona labeled "Type No. 16221"; 4 specimens from Laredo, Texas; 1 from Brownsville, Texas (C. H. T. Townsend); and 1 from Florence, Arizona (C. B. Biederman).

Genus BRACON Fabricius

Bracon FABRICIUS, Syst. Piez., 1804, p. 102. *Genotype.—Ichneumon desertor* Linnaeus (By designation of Curtis, Brit. Ent., 1825, No. 69).

Cremnops FOERSTER, Verh. naturh. Ver. preuss. Rheinl., vol. 19, 1862, p. 246. *Genotype.*—[*Agathis deflagrator* Nees (Monobasic)]=*Cremnops desertor* (Linnaeus).

This genus has been discussed in detail by Morrison,[8] who has included in his paper a revision of the Nearctic species. It is therefore unnecessary to consider the group here further than to describe a single species which was not included by Morrison.

BRACON CRASSIFEMUR, new species

At once distinguished by the broad posterior femora. In Morrison's key it falls nearest *vulgaris* (Cresson), because the antennal scape is produced into a distinct tooth in front; but it can be easily separated from *vulgaris* by the more robust form, the unusually broad posterior femora, and the entirely black head and mesopleura.

Male.—Length, 9 mm.; face long, rostriform; malar space fully as long as the eye; face slightly impressed medially below the antennae; frontal impression unusually strongly margined laterally; frons and vertex polished; the lateral ocelli separated by a prominent polished elevation; ocell-ocular line fully twice the diameter of a lateral ocellus; antennae of type 45-segmented, of paratype 43-segmented; apex of antennal scape produced into a conspicuous tooth inwardly in front, this tooth more strongly developed than is usually true of *vulgaris;* pronotal pits large and deep, distinctly separated; parapsidal furrows

[8] Proc. U. S. Nat. Mus., vol. 52, 1917, pp. 305-343.

impressed, smooth; the middle mesonotal lobe shallowly impressed down the middle; fossa in front of scutellum very broad and deep, entirely polished, and with a median carina bisecting it; scutellum polished; propodeum aerolated, shining; the median area long and narrow, acute at base; posterior face of propodeum abruptly declivous, separated from the dorsal face by a sharp transverse carina; pleura polished; mesopleural furrow shallow, not foveolate; posterior femora short and unusually broad; posterior tibiae stouter than usual, sloping off rather strongly on the outer side of the apex, above the terminal spurs, and here provided with an exceptionally large number of conspicuous short stout spines, there being more than forty of these spines on each hind tibia; inner spur of posterior tibiae much longer than the outer and nearly half as long as the basitarsus; apical segment of posterior tarsi stout and about as long as the second tarsal segment; claws cleft; wing venation essentially as in *vulgaris;* abdomen as long as head and thorax, narrower than the thorax, entirely smooth and polished. Head entirely black; antennae and palpi black; thorax dark ferruginous, with the venter, the prothorax except more or less of the propleura, the mesopleura entirely, and the middle mesonotal lobe anteriorly black; wings strongly infumated; anterior and middle legs wholly black; posterior legs red, their trochanters and tarsi black; abdomen entirely red.

Type.—In the collection of the University of Illinois.

Type locality.—Baboquivari Mountains, Pima Company, Arizona.

Described from two male specimens collected July 27–31, 1923, by O. C. Poling. Through the kindness of Dr. T. H. Frison, curator of the insect collection at the University of Illinois, the paratype, which is practically a duplicate of the type, has been deposited in the United States National Museum, and has been given Catalogue No. 28689.

Genus AENIGMOSTOMUS Ashmead

Aenigmostomus Ashmead, Proc. U. S. Nat. Mus., vol. 23, 1900, p. 128. *Genotype.—Microdus longipalpus* Cresson (Monobasic).

This genus is based upon the remarkable form of the maxillary palpi, which are modified to form a 5-segmented hollow beak that it usually about as long as the head and thorax. This character alone will separate the group from all other genera in the Braconinae.

Head transverse, strongly hollowed out behind; eyes moderately large; malar space less than half the length of eyes; face rather narrow, but about as broad as long from antennal foramina to apex of clypeus; labial palpi very slender; mandibles short, the tips not quite meeting, bidentate, the teeth short; labrum large; clypeus long, convex, only a little broader than long; frontal impressions not margined by carinae; antennae slender; thorax long and narrow; parapsidal furrows finely impressed, usually not distinct anteriorly; scu-

tellum not margined at apex; mesopleural furrow finely foveolate; prepectal carina wanting; propodeum rugulose, with two slightly diverging median carinae; wings as in *Bassus;* first cubital and first discoidal cells confluent; second cubital cell triangular, sessile; spurs of hind tibia less than half the length of basitarsus; several short stout spines at apex of posterior tibiae above the outer terminal spur; tarsal claws simple, or with an indistinct basal tooth; abdomen slender, rather broadly sessile, the basal tergites more or less sculptured; hypopygium moderate, not surpassing apex of last dorsal segment; ovipositor long.

This genus is represented by a single known species.

AENIGMOSTOMUS LONGIPALPUS (Cresson)

Microdus? longipalpus CRESSON, Proc. Ent. Soc. Phila., vol. 4, 1865, p. 299.
Aenigmostomus longipalpus ASHMEAD, Proc. U. S. Nat. Mus., vol. 23, 1900, p. 128.

Type.—No. 2745, Academy of Natural Sciences, Philadelphia, Pennsylvania.

The following characters, combined with the above generic description, will identify this species: Temples rather broad, but sloping off gradually, not bulging; cheeks strongly receding; antennae usually 24 to 26 segmented, the flagellum slender, not tapering at all to the apex; ocell-ocular line distinctly less than twice the diameter of an ocellus and scarcely as long as the postocellar line; no tubercles between antennae; outer margins of antennal foramina very close to the eyes; mesoscutum and scutellum polished, the latter flat; mesosternum fully as long as broad; propodeum finely rugulose, with two prominent median carinae which diverge slightly behind; the dorsal face of propodeum long and only very slightly declivous; propodeal spiracle very small, nearly circular; radius arising from about the middle of stigma; areolet triangular, sessile; first abscissa of mediella slightly longer than the second; nervellus angled and emitting the discoidella from this angle; posterior tibiae distinctly shorter than their tarsi; the terminal spurs of hind tibia of equal length and only about one-third as long as the posterior basitarsus; last segment of hind tarsi shorter than the third: first abdominal tergite scarcely longer than broad, impressed at base, with two widely separated dorsal longitudinal keels, and finely longitudinally rugulose; second tergite very finely sculptured and with a more or less distinct transverse impression just behind the middle; remainder of abdomen polished; ovipositor sheaths a little longer than the entire body. Head and thorax black; wings uniformly infuscated; legs, including all coxae, testaceous; all tarsi more or less dusky; abdomen yellow-ferruginous, the first tergite except at apex, and sometimes more or less of the apical segments, blackish.

In addition to the type, which is from Colorado, I have seen the following specimens, which are in the collection of the United States National Museum: One from Nebraska; 1 from Tifton, Georgia; 2 from southern Illinois (Robertson); 1 from Onaga, Kansas, and 5 from Riley County, Kansas (Marlatt).

Genus AGATHIRSIA Westwood

Agathirsia Westwood, Tijdschr. v. Ent., vol. 25, 1882, p. 20. *Genotype.—Agathirsia rufula* Westwood (by designation of Viereck, Bull. 83, U. S. Nat. Mus., 1914, p. 6).

Agathona Westwood, Tijdschr. v. Ent., vol. 25, 1882, p. 22. *Genotype.—Agathona sericans* Westwood (Monobasic).

Paragathis Ashmead, Proc. U. S. Nat. Mus., vol. 11, 1889 (1888), p. 638. *Genotype.—Microdus thoracicus* Cresson (Monobasic).

Agathirsia Westwood=(*Paragathis* Ashmead), Ashmead, Proc. U. S. Nat. Mus., vol. 23, 1900, p. 128.

Agathirsia Westwood=(*Agathona* Westwood), Szepligeti, Gen. Ins., fasc. 22, 1904, p. 128.

I have not seen the genotype of *Agathona*, but judging by Westwood's description and figure it appears probable that Szepligeti was correct in synonymizing this genus with *Agathirsia*. That *Paragathis* Ashmead belongs here is very evident from a comparison of the genotype.

Head transverse, at least as broad as the thorax, rather strongly hollowed out behind; face much broader than long from antennal foramina to apex of clypeus; labium usually prominently extended; mandibles falcate, with a very short tooth within; maxillary palpi 5-segmented; labial palpi 4-segmented; frontal impressions immargined; no prominent elevations between antennae; vertex rather narrow; ocelli small; ocell-ocular line at least three times the diameter of an ocellus; temples rather broad, bulging somewhat; antennae of the female usually short, most of the flagellar segments stout; thorax stout; parapsidal furrows impressed, foveolate; furrow in front of scutellum broad, deep; mesopleural furrow foveolate: propodeum short and broad, more than twice as broad as long down the middle, rugose, not areolated; propodeal spiracle oval, rather prominent; coxae stout; posterior tibiae with numerous minute stout spines on the outer side at the apex; inner spur of posterior tibia distinctly less than half the metatarsus; posterior metatarsus more or less incrassate; apical tarsal segment large, long; tarsal claws with a distinct basal tooth; wings yellow to nearly hyaline on basal half or more, the area covered by the third cubital, second discoidal, and second brachial cells rather contrastingly dusky; second cubital cell subtriangular, usually petiolate; abdomen stout, completely polished with not even a suggestion of sculpture; first tergite without dorsal

keels or elevations; hypopygium large, but not surpassing the apex of last dorsal abdominal segment; ovipositor sheaths not longer than the abdomen.

The host relationships of none of our species are known.

KEY TO THE THREE KNOWN NEARCTIC SPECIES OF AGATHIRSIA

1. Head and thorax testaceous, with only the prepectus and coxal cavities sometimes black; malar space more than half as long as the eye-height; posterior margin of mesosternum with a distinct backwardly-projecting lobe on either side of the mesosulcus; posterior metatarsus only slightly incrassate; face and propodeum with short scattered pubescence; ovipositor sheaths about as long as the abdomen ..... 1. testacea, new species.

   Head black; thorax except mesonotum and part of propleura, black; malar space not more than half as long as the eyes; posterior margin of mesosternum without a distinct lobe either side of the mesosulcus; posterior metatarsus more strongly incrassate; face and propodeum with long sericeous pile; ovipositor sheaths distinctly shorter than the abdomen ..... 2.

2. Legs testaceous, with the anterior and middle coxae, and sometimes the posterior coxae, black; abdomen ferruginous on the basal half, completely black on the apical half ..... 2. nigricauda (Viereck).

   All coxae and trochanters, the posterior femora and more or less of the anterior and middle femora, black; abdomen yellowish-ferruginous, varied with black; first abdominal tergite yellowish with a large black spot on apical half; extreme apex of abdomen above, ferruginous. 3. thoracica (Cresson).

1. AGATHIRSIA TESTACEA, new species

Female.—Length 8 mm. Head transverse; temples bulging somewhat, but not broad; face much broader than long, slightly convex, punctate; clypeus large, broader at apex than distance from antennal foramina to clypeus: labrum large; labium only slightly extended; malar space longer than half the eye height and longer than the first segment of antennal flagellum; eyes long oval; ocell-ocular line nearly four times the diameter of an ocellus; antennae stout, short, 27-segmented in type, none of the flagellar segments beyond the first twice as long as broad, the segments of the apical third of flagellum mostly broader than long; parapsidal furrows impressed, finely foveolate; middle mesonotal lobe with a low median longitudinal elevation; the lobes only slightly convex; furrow in front of scutellum broad, deep, divided into several large pits; scutellum rather large, convex; propleura mostly ruguloso-punctate; mesopleural furrow coarsely foveolate; propodeum more than twice as broad as long, coarsely rugose; metapleura mostly ruguloso-punctate; posterior margin of mesosternum with a distinct backwardly projecting lobe on either side of the mesosulcus; posterior coxae stout, punctate; posterior tibiae thickened at apex and with some rather indistinct,

small, stout spines just above apex on the outer side; posterior metatarsus a little incrassate; radius arising from about the middle of stigma; areolet subtriangular, rather large, subpetiolate, slightly oblique; abdomen stout, about as long as the thorax, completely polished; first tergite about as broad at apex as long, without dorsal keels or other elevations; ovipositor sheaths about as long as the abdomen; ovipositor decurved at tip. Head, thorax, and abdomen ferrugino-testaceous; prepectus and coxal cavities usually black; antennae yellow on basal third, blackish beyond; legs concolorous with the body; wings hyaline on basal half, contrastingly dusky apically over an area comprised of the third cubital, second discoidal, and second brachial cells; abdomen sometimes more or less brownish apically.

Type.—Cat. No. 28693, U.S.N.M.

Type locality.—Mesilla, New Mexico.

Described from two female specimens collected by T. D. A. Cockerell. In the United States National Museum there are seven additional specimens, not included in the type series. These are from San Diego, Costulla, Brownsville, and Brewster County, Texas; and Las Cruces, New Mexico.

2. AGATHIRSIA NIGRICAUDA (Viereck)

Crassomicrodus nigricaudus VIERECK, Trans. Kans. Acad. Sci., vol. 19, 1905, p. 288.

Type.—In the University of Kansas collection.

Very similar to *thoracica*, but readily separated by the color characters given in the key. Thorax black except the upper margin of propleura and the mesoscutum, which are ferruginous; legs uniformly brownish yellow, with only the anterior and middle coxae and more or less of posterior coxae black; first, second, and basal half of third tergites ferruginous; remainder of abdomen entirely black; wings yellow, infuscated at apex, the infuscated area covering third cubital, second discoidal, and second brachial cells. Face with long sericeous pubescence, not convex, but rather weakly broadly impressed on either side of the middle line; malar space not half as long as the eye and hardly as long as second flagellar segment; antennae usually 30 to 33 segmented; temples and cheeks broad, swollen; propodeum coarsely rugose and provided with long sericeous pile; inner spur of hind tibia less than half the basitarsus. Posterior basitarsus incrassate, but not as broad as in *thoracica;* ovipositor sheaths a little longer than in that species, and somewhat shorter than in *testacea*, about as long as the abdomen beyond first segment.

The United States National Museum has four specimens of this species which are from Colorado and New Mexico.

3. AGATHIRSIA THORACICA (Cresson)

Microdus thoracicus CRESSON, Trans. Amer. Ent. Soc., vol. 4, 1872, p. 181.
Paragathis thoracicus ASHMEAD, Proc. U. S. Nat. Mus., vol. 11, 1889 (1888), p. 638.

Type.—The type of this species is in the Academy of Natural Sciences at Philadelphia, Pennsylvania; paratypes are in the United States National Museum.

Readily disinguished by the characters given in the key to species. Face closely punctate, pilose, not convex, somewhat impressed either side of the median line: malar space considerably less than half the length of the eyes; temples broad, bulging; antennae usually 29 to 31 segmented, the female antennae with most of the 15 apical segments broader than long; parapsidal furrows deeply impressed; the middle mesonotal lobe rather flat, with a low polished median longitudinal elevated line; scutellum short and very broad, propodeum rugose, with long, abundant, sericeous pile; posterior tibiae with numerous short, stout spines on the outer side at apex; posterior basitarsus strongly incrassate; last segment of hind tarsi about as long as the second; first abdominal tergite usually slightly longer than broad at apex, the apical half convex, with a faint median longitudinal impression; ovipositor sheaths not, or only a little, longer than first abdominal segment. Head black; female antennae bright orange yellow, with a little more than the apical third black; thorax black, with only upper half of propleura and the mesoscutum yellow-ferruginous; the first abdominal tergite testaceous with a large black spot apically; remainder of abdomen more or less varied with blackish, but the apical segments above always ferruginous; all coxae and trochanters black; the fore femora black at base and below; the middle femora usually mostly black, and the posterior femora black except narrowly at apex; tibiae and tarsi bright yellow; wings yellow, with the third cubital, the second discoidal, and second brachial cells infuscated.

In addition to four paratypes the National Museum has nine specimens, likewise collected in Texas.

Genus CRASSOMICRODUS Ashmead

Crassomicrodus ASHMEAD, Proc. U. S. Nat. Mus., vol. 23, 1900, p. 128. *Genotype.*—*Microdus fulvescens* Cresson (Monobasic).
Epimicrodus ASHMEAD, Proc. U. S. Nat. Mus., vol. 23, 1900, p. 129. *Genotype.*—*Microdus diversus* [sic]=*divisus* Cression (Monobasic).
Crassomicrodus Ashmead=(*Epimicrodus* Ashmead), BRADLEY, Psyche, vol. 23, 1916, pp. 139–140.

Bradley was correct in reducing *Epimicrodus* to synonymy under *Crassomicrodus*. The two genotypes, *Microdus fulvescens* Cresson and *Microdus divisus* Cresson, are unquestionably congeneric.

Head transverse, but frequently swollen behind the eyes, at least as broad as the thorax, and not distinctly rostriform; face much broader than long from antennal foramina to apex of clypeus; malar space usually half, or more than half, as long as the eye height; clypeus large, broad, convex, often a little elevated anteriorly; mandibles rather long, bidentate, the superior tooth long and acute, the inferior tooth very short; palpi normal, the maxillary palpi 5-segmented, the labial 4-segmented; frons smooth, the frontal impressions not margined by carinae; ocelli small, ocell-ocular line always much more than twice as long as the diameter of an ocellus; parapsidal furrows impressed; mesopleural furrow usually foveolate; propodeum sloping gradually from base to apex or slightly rounded, rugulose, not areolated; legs moderate; posterior tibiae without short stout spines outwardly at apex, above the outer terminal spur; inner spur of hind tibiae varying from a little shorter to much longer than half the basitarsus; tarsal claws simple, never cleft, nor with a basal tooth; wings dusky; radius arising at or beyond middle of stigma; second cubital cell small, subtriangular, oblique, petiolate; first cubital and first discoidal cells confluent; abdomen very narrow at extreme base, broad at the middle, completely polished, with not even a suggestion of sculpture; first tergite rather flat, slightly impressed at base, without dorsal longitudinal keels, narrow at base, strongly widened to the apex, where it is at least nearly as broad as long; hypopygium not prominent; ovipositor extremely short, the sheaths scarcely projecting beyond apex of abdomen. Head and thorax varying from testaceous to black; abdomen always testaceous or ferruginous, rarely black at extreme base.

KEY TO THE SPECIES OF CRASSOMICRODUS

Crassomicrodus? melanopleurus (Ashmead) is not included in this key. See page 22.

1. Head and thorax entirely black; first abdominal tergite black basally; all coxae and trochanters black; parapsidal grooves sharply impressed and finely foveolate; furrow in front of scutellum divided into 6 or more pits by distinct septa ..... 1. nigrithorax, new species.
   At least the mesonotum testaceous ..... 2.
2. Anterior wing hyaline at apex; propodeum straight, not rounded from base to apex; impression between lateral ocelli deep, weakly foveolate; inner spur of hind tibia longer than half the basitarsus ..... 2. apicipennis, new species.
   Anterior wing not hyaline at apex; propodeum usually distinctly a little rounded from base to apex; impression between lateral ocelli usually shallow and smooth; length of inner spur of hind tibia variable ..... 3.
3. Inner spur of posterior tibia not distinctly longer than half the basitarsus; last segment of hind tarsi much longer than the third, and nearly or quite as long as the second; cheeks and temples bulging prominently; cheeks, in front view, strongly rounded ..... 4.

Inner spur of posterior tibia decidedly more than half the basitarsus; last segment of hind tarsi not or scarcely longer than the third and considerably shorter than the second; cheeks and temples not bulging so prominently; the cheeks, in front view, sloping rather evenly ..... 5.

4. Head and thorax entirely testaceous, very rarely with propodeum more or less blackish; legs testaceous, except usually all the trochanters, the apex of posterior tibiae, and the posterior tarsi, which are generally blackish ..... 3. **fulvescens** (Cresson).

Head black; thorax with pectus, meso- and meta-pleura, and propodeum mostly black; anterior and middle coxae, the posterior coxae usually and all trochanters black ..... 4. **medius** (Cresson).

5. Head usually yellow, sometimes frons and vertex blackish, very rarely head entirely black; basal segment of posterior tarsi barely more than twice the second; first abdominal tergite only very slightly longer than propodeum; radial cell measured along wing margin not more than half as long as second abscissa of radius; length normally 4 to 5 mm .. 5. **pallens** (Cresson).

Head black, face occasionally reddish medially; basal segment of posterior tarsi much more than twice the second; first abdominal tergite much longer than propodeum; radial cell measured along wing margin distinctly more than half as long as second abscissa of radius; length normally 7 to 8 mm ..... 6.

6. Anterior and middle legs black or blackish; meso- and meta-pleura, propodeum, and pectus nearly always mostly black; propleura more or less wrinkled anteriorly ..... 6. **divisus** (Cresson).

Anterior and middle femora and tibiae testaceous; the black markings on thorax usually confined to the venter; propleura polished ..... 7. **nigriceps** (Cresson).

1. CRASSOMICRODUS NIGRITHORAX, new species

Female.—Length 4 mm.; face more than twice as broad as long from antennal foramina to clypeus; clypeus large, prominent, its width at apex greater than the distance from antennal foramina to clypeus; face and clypeus smooth and polished, with long sparse pubescence; malar space a little longer than half the eye height; cheeks and temples broad, full, polished; the former somewhat rounded; eyes rather strongly convex, broadly oval, distinctly broader than the temples; frons smooth and polished; two low widely separated tubercles between antennae; ocell-ocular line at least three times the diameter of an ocellus; antennae 32-segmented in the type, nearly as long as the body; the scape large and stout; parapsidal furrows deeply impressed, finely foveolate; the mesonotal lobes and scutellum polished, the latter fully as long as broad; furrow in front of scutellum with about from six to eight distinct pits; pro- and meso-pleurae polished; meso-pleural furrow foveolate; propodeum sloping gradually from base to apex, not distinctly rounded, finely rugulose, with a small polished area medially at apex; metapleura mostly smooth, with scattered punctures; propodeal spiracle short oval; posterior coxae polished; inner spur of posterior tibia a little longer than half the metatarsus; last segment of hind tarsi some-

what longer than the third; areolet of fore wing small, triangular, oblique, petiolate; nervulus postfurcal; first abscissa of mediella about equal to the second; nervellus not angled; discoidella only weakly indicated; abdomen about as long as the thorax, entirely smooth and polished; first tergite broadening strongly toward apex, where it is about as broad as long; ovipositor barely exserted. Head and thorax entirely black; all coxae and trochanters black; all femora more or less black basally; middle tibiae blackish apically, hind tibiae black on apical half; wings infumated, the hyaline spots below stigma rather poorly defined; abdomen ferruginous, the first tergite black on basal half or more.

Male.—Essentially as in the female.

Type.—Cat. No. 28694, U.S.N.M.

Type locality.—Colorado.

Described from one female and one male labeled "Colo. 1329, C. F. Baker Collection."

2. CRASSOMICRODUS APICIPENNIS, new species

Very similar to *nigrithorax* in habitus, but differing particularly in having at least the mesonotum and propleura testaceous, and in the weaker parapsidal grooves. From *medius*, which it closely resembles in color, it differs in being considerably smaller and more compact, in the relatively longer spurs of posterior tibiae, and in the extreme apex of anterior wings being hyaline.

Female.—Length, 5 mm. Face at least twice as broad as long between antennal foramina and base of clypeus; clypeus shining, weakly punctate; malar space at least half as long as the eye height; eyes broadly oval, rather strongly convex, a little broader than the temples; temples and cheeks broad, bulging somewhat, smooth and polished; frons and vertex polished; antennae 33-segmented in the type, nearly as long as the body; all the flagellar segments longer than broad; two low rather widely separated tubercles between the antennae; ocell-ocular line nearly three times the diameter of an ocellus; a short rather deep, weakly foveolate groove between lateral ocelli; thorax compact parapsidal grooves present, but very shallow, weakly foveolate posteriorly; scutellum about as long as broad, polished; furrow in front of scutellum usually with four distinct pits; mesopleural furrow a little curved, foveolate; propodeum evenly declivous from base to apex, not rounded, rugulose; propodeal spiracle short oval; metapleura punctate, rugulose below; posterior coxae polished; inner spur of hind tibiae distinctly more than half as long as the basitarsus; last segment of hind tarsi somewhat longer than the third; areolet of fore wing small triangular, oblique, petiolate; stigma not three times as long as broad; radius arising only a little beyond middle of stigma; first abscissa of mediella about

as long as the second; nervellus not angled; abdomen short, about as long as the thorax, entirely polished; first tergite slightly longer than broad at apex, and at least two and one-half times as broad at apex as at base. Head entirely (except mandibles which are red), pectus, mesopleura, metapleura, propodeum, all coxae and trochanters, apex of posterior tibiae, and the posterior tarsi black; extreme apex of middle tibiae and their tarsi dusky; pronotum and propleura, mesoscutum, scutellum, and metanotum testaceous; abdomen ferruginous; wings infumated, the anterior pair more weakly so apically and completely hyaline along apical margin.

Male.—Antennae of allotype with 32 segments; otherwise as in the type.

Type.—Cat. No. 28695, U.S.N.M.

Type locality.—Mount Hood, Oregon.

Described from one male and one female. Undoubtedly additional specimens will exhibit more or less variation in the color of the thorax and legs. In the type one hind coxa is black while the other is red, suggesting the variability of these parts.

3. CRASSOMICRODUS FULVESCENS (Cresson)

Microdus fulvescens CRESSON, Proc. Ent. Soc. Phila., vol. 4, 1865, p. 297.
Crassomicrodus fulvescens ASHMEAD, Proc. U. S. Nat. Mus., vol. 23, 1900, p. 128.

Type.—No. 1727.1, Academy of Natural Sciences, Philadelphia, Pennsylvania.

This species can be distinguished especially by its uniformly honey-yellow color, its broad, strongly swollen cheeks and temples, and the relatively short inner spur of hind tibia, which is hardly half as long as the basitarsus. Rarely the propodeum is more or less blackish; the legs, including the coxae, are pale testaceous, with all trochanters usually, though not always, black; wings rather uniformly infumated with large hyaline spots in the first cubital and second discoidal cells; eyes not strongly convex, rather small; malar space more than half as long as the eye height; cheeks and temples as broad as the eyes; antennae usually 36 to 38 segmented; apical segment of posterior tarsi very slender, about as long as the second segment.

In addition to the type about 15 specimens have been examined, all of these being in the National Museum; they are from various localities in Colorado, Texas, Kansas, New Mexico, and Arizona.

4. CRASSOMICRODUS MEDIUS (Cresson)

Microdus medius CRESSON, Proc. Ent. Soc. Phila., vol. 4, 1865, p. 298.

Type.—No. 1725, Academy of Natural Sciences, Philadelphia, Pennsylvania.

Resembles *divisus* exceedingly closely in color, differing, however, in having the fore and middle legs beyond the trochanters entirely

pale testaceous, while the posterior coxae are usually black. It differs from *divisus* and resembles *fulvescens* in the strongly bulging temples and cheeks, and in the shorter inner spur of posterior tibiae, also in the longer apical segment of posterior tarsi. Propleura completely polished; radius arising only slightly beyond middle of stigma; hyaline spots in first cubital and second discoidal cells large, confluent, more conspicuous than in *divisus*, the first cubital cell being entirely hyaline except at extreme apex. Head black; thorax black, with the pronotum, propleura, and mesonotum testaceous; sometimes mesopleura testaceous above; abdomen entirely testaceous; coxae, trochanters, apex of hind tibiae, and the hind tarsi black; occasionally the hind coxae testaceous.

The type and the nine specimens which are in the National Museum are all males. The localities represented are points in Colorado, New Mexico, and Kansas.

5. CRASSOMICRODUS PALLENS (Cresson)

Microdus pallens CRESSON, Canad. Entom., vol. 5, 1873, p. 53.

Type.—No. 2746, Academy of Natural Sciences, Philadelphia, Pennsylvania.

Most specimens of this species closely resemble *fulvescens* in color, but can be readily separated from that species by the following characters: Inner spur of hind tibia more than half as long as the basitarsus; last segment of hind tarsi not distinctly longer than the third and much shorter than the second; malar space in the male at least two-thirds the eye height, and in the female nearly as long as the eye height; temples and cheeks not strongly bulging, the latter sloping rather evenly, not conspicuously rounded, as seen from in front; hyaline spot in anterior wing less distinct than in *fulvescens;* length normally 4 to 5 mm. Color usually rather uniformly testaceous; head sometimes more or less blackish, very rarely entirely black; antennae black, the scape usually reddish beneath; propodeum sometimes blackish; legs usually entirely yellow, except the apex of hind tibiae and the hind tarsi, which are black; but occasionally the anterior and middle coxae and trochanters, and very rarely the posterior coxae and trochanters as well, blackish.

The type is from Illinois; specimens in the United States National Museum are from Providence, Rhode Island; Huntsville and New Boston, Texas; Georgia; Massachusetts; Rosslyn, Virginia; Alabama; and Riverton, New Jersey. I have also seen two specimens from Meredosia and Havana, Illinois, which are in the collection of the University of Illinois.

6. CRASSOMICRODUS DIVISUS (Cresson)

Microdus divisus CRESSON, Canad. Entom., vol. 5, 1873, p. 52.
Orgilus rileyi ASHMEAD, Proc. U. S. Nat. Mus., vol. 11, 1889 (1888), p. 640.
Epimicrodus diversus ASHMEAD, (sic!) Proc. U. S. Nat. Mus., vol. 23, 1900, p. 129.
Crassomicrodus divisus BRADLEY, Psyche, vol. 23, 1916, pp. 139–140.

Type.—No. 1726.1, Academy of Natural Sciences, Philadelphia, Pennsylvania. The type of *rileyi* is in the United States National Museum.

The types of *divisus* and *rileyi* agree perfectly, and unquestionably are the same species. *C. divisus* differs from *medius*, which it closely resembles, as noted in the discussion under that species. The head is usually entirely black; thorax usually mostly black, with the pronotum, propleura, and mesonotum testaceous; anterior and middle legs black or blackish, their tibiae, especially the anterior pair, sometimes mostly pale; posterior coxae usually testaceous, more or less black apically, but varying from entirely black to entirely testaceous; posterior trochanters black, their femora reddish, usually somewhat blackish apically; their tibiae and tarsi usually mostly blackish; abdomen reddish testaceous; wings strongly infumated, the hyaline spots below stigma not so conspicuous as in *medius*. Cheeks and temples broad, but not bulging strongly; the cheeks, as seen from in front, sloping rather evenly, not much rounded; malar space more than half the eye height in the male and about three-fourth as long as the eye height in the female; impression between lateral ocelli shallow, smooth; propleura usually somewhat roughened anteriorly; propodeum slightly rounded, not sloping evenly from base to apex; both spurs of middle tibia much longer than half the basitarsus; inner spur of hind tibiae also considerably longer than hind basitarsus; last segment of posterior tarsi about as long as the third segment and shorter than the second; radius arising considerably beyond the middle of stigma; radial cell measured along wing margin very distinctly longer than half the second abscissa of radius Length usually 7 to 8 mm.

The above notes are based on the types; on about 25 additional specimens of both sexes in the United States National Museum, which are from various localities in Texas, Colorado, Illinois, Ohio, Michigan, Virginia, Louisiana, and Kentucky, and 10 specimens from Illinois in the collection of the University of Illinois.

7. CRASSOMICRODUS NIGRICEPS (Cresson)

Microdus nigriceps CRESSON, Trans. Amer. Ent. Soc., vol. 4, 1872, p. 182.

Type.—In the United States National Museum.

The type is a female, although it was originally described as a male, the extremely short ovipositor having been overlooked. It is exceedingly close to *divisus* and may eventually prove to be that spe-

cies; but for the present it seems desirable to hold it distinct. It appears to differ from *divisus* in having the anterior and middle femora and tibiae testaceous, in the almost entirely testaceous thorax, and in the completely polished propleura; but I do not feel at all satisfied that these differences are of specific value.

In addition to the type I have seen only one specimen, collected by C. H. T. Townsend at Brownsville, Texas.

? CRASSOMICRODUS MELANOPLEURUS (Ashmead)

Microdus melanopleurus ASHMEAD, Proc. Calif. Acad. Sci., vol. 4, 1894, p. 125.

I have not seen the type of this species which is apparently in the California Academy of Sciences; but from the short original description it appears to belong to *Crassomicrodus*, and it may very well prove to be *C. medius* (Cresson).

Genus BASSUS Fabricius

Bassus FABRICIUS, Syst. Piez., 1804, p. 93. *Genotype.—Ichneumon calculator* Fabricius (by designation of Curtis, Brit. Ent., vol. 2, 1825, p. 73).

Agathis LATREILLE, Hist. Nat. Crust. Ins., vol. 13, 1805, p. 175. *Genotype.—Agathis malvacearum* Latreille (Monobasic).

Microdus NEES, Nov. Act. Acad. Nat. Curios, vol. 9, 1818, p. 304. *Genotype.—Ichneumon calculator* Fabricius (Monobasic).

Therophilus WESMAEL, Nouv. Mem. Acad. Sci. Brux., vol. 10, 1837, p. 15. *Genotype.—Therophilus conspicuus* Wesmael=[(*Microdus*) *Bassus tumidulus*, var. *conspicuus* Wesmael] (by designation of Viereck, Bull. 83, U. S. Nat. Mus., 1914, p. 145).

Eumicrodus FOERSTER, emendation of *Microdus* Nees, Verh. naturh. Ver. preuss. Rheinl., vol. 19, 1862, p. 247.

Lytopylus VIERECK, not Foerster, Trans. Kansas Acad. Sci., vol. 19, 1905, p. 267. *Genotype.—Lytopylus azygos* Viereck (Monobasic).

Aerophilopsis VIERECK, Proc. U. S. Nat. Mus., vol. 44, 1913, p. 555. *Genotype.—Bassus* (*Aerophilopsis*) *erythrogaster* Viereck (Monobasis).

Westwood[9] designated *Ichneumon laetatorius* Fabricius as the type of *Bassus*, and this interpretation, which placed the genus in the subfamily Tryphoninae of the family Ichneumonidae, has been generally followed. However, Curtis, as noted in the above synonymy, had previously designated *Ichneumon calculator* Fabricius as type, thus making the genus isogenotypic with *Microdus* Nees, and because of the priority supplanting the latter name in the Braconidae. This condition unfortunately was not explained until recently, when Viereck[10] synonymized *Microdus* Nees with *Bassus* Fabricius. *Bassus*, of Authors, as shown by Bradley,[11] is *Diplazon* (Nees) Gravenhorst.

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[9] Intr. Mod. Class. Ins., vol. 2, 1840, Gen. Syn. p. 59.

[10] Bull. 83, U. S. Nat. Mus., 1914, p. 94.

[11] Trans. Ent. Soc. London, 1919, p. 59.

Up to the present *Agathis* Latreille has been held distinct from (*Microdus* Nees) = *Bassus* Fabricius solely on the basis of the length of the face, and on this character it has usually been more closely associated with (*Cremnops* Foerster) = *Bracon* Fabricius, being even treated as a subgenus of *Bracon* by Viereck.[12] Although Lyle[13] considered *Agathis* to be separable from *Bassus* "by characters that are of little more than specific value," he nevertheless held the two distinct, evidently believing the difference in the length of the face to be rather clear-cut. The study of a large amount of material, however, has convinced me that it is virtually impossible to separate species on this character alone; and although I dislike to suppress a name so long and generally employed, I can find no basis upon which to adequately distinguish *Agathis* from *Bassus* and believe it advisable to synonymize the two genera.

Wesmael proposed the name *Therophilus* for a subgenus of *Microdus*, which accounts for the inclusion of this name in the synonymy of *Bassus*. *Aerophilopsis* Viereck was likewise published as merely the name of a subgenus of *Bassus;* and Viereck himself has recently[14] explained that his *Lytopylus* is not the *Lytopylus* of Foerster, but is rather a synonym of his own subgenus *Aerophilopsis*.

The following characters apply to *Bassus*, as I have considered the genus in this paper: Head transverse; face varying from long and rostriform to very short; maxillary palpi normal, five-segmented, not modified to form a long beak; labial palpi four-segmented, the third segment often very short and sometimes hardly distinct; frons usually immargined, but in a few species the frontal impressions are distinctly carinately margined; parapsidal furrows nearly always impressed or indicated, rarely entirely wanting; mesopleural furrow varying from strongly impressed and coarsely foveate to very weak and completely smooth; sculpture of propodeum variable; first cubital and first discoidal cells confluent; second cubital cell usually very small, triangular, never broadly sessile, the second abscissa of radius rarely present and then very short; length of submediellan cell variable, the first abscissa of mediella varying from much shorter to distinctly longer than the second; legs moderate; inner spur of posterior tibia rarely quite half as long as the basitarsus; posterior basitarsus not incrassate; tarsal claws not cleft, but with a basal tooth which is usually broad and pronounced; abdomen sessile, the basal tergites sometimes more or less sculptured, the first often with one or two conspicuous dorsal longitudinal keels; ovipositor prominently exserted, the sheaths at least as long as the abdomen.

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[12] Bull. 22, Conn. Geol. and Nat. Hist. Survey, 1917 (1916), p. 231.
[13] The Entomologist, vol. 53, 1920, p. 177.
[14] Proc. U. S. Nat. Mus., vol. 59, 1921, p. 139.

This is the largest and probably the most important of our genera of Braconinae. Unfortunately nothing is known regarding the host relationships of most of our species. A few of them, however, have been rather commonly reared; and wherever authentic host records are available these will be mentioned in the discussions of the various species.

KEY TO THE SPECIES OF BASSUS.

Bassus rugareolatus Viereck, *B. quebecensis* (Provancher), and *B. verticalis* (Cresson) are not included in this key. See discussion of these species in the text.

1. Frontal impressions margined by carinae; first abdominal tergite with a median longitudinal elevation, usually in the form of a polished keel, arising at the posterior margin of the basal impression and extending posteriorly; scutellum more or less distinctly carinately margined at apex; head not, or only slightly, excavated behind; third segment of labial palpi very short, sometimes scarcely apparent; antennae normally 38 to 50 segmented; second cubital cell large, triangular, generally sessile; second abscissa of mediella much longer than the first; large species, usually measuring 7 to 9 mm. in length ..... 2.

   Frontal impressions immargined; otherwise not combining all the above characters ..... 7.

2. Thorax, except usually the metapleura and propodeum, black; mesonotum always black ..... 6.

   Thorax testaceous or ferruginous, at most with the prothorax, the pectus and the sutures surrounding the scutellum black; mesonotum never black ..... 3.

3. Anterior and middle legs entirely testaceous—1. **marginatifrons**, new species.

   Anterior and middle legs mostly black ..... 4.

4. Inner spur of posterior tibia not half as long as the basitarsus; propodeum weakly sculptured, with lateral longitudinal carinae and two weak, nearly parallel median longitudinal carinae, not areolated; ovipositor sheaths considerably longer than the body ..... 5.

   Inner spur of posterior tibia half as long as the basitarsus; propodeum completely areolated, the separating carinae very prominent, the areas rugose within; metapleura rugoso-reticulate; first abdominal tergite rugose on either side of the prominent median longitudinal keel

   2. **floridanus**, new species.

5. First abdominal tergite smooth, the basal impression not completely margined by carinae, and the median elevation behind the impression poorly defined, not developed into a sharp keel; furrow in front of scutellum not distinctly pitted; inner spur of posterior tibia only slightly less than half the basitarsus ..... 3. **nigrotrochantericus** (Viereck).

   First abdominal tergite with the basal impression completely margined by strong carinae, which unite behind the impression to form a sharp prominent median ridge; furrow in front of scutellum with several pits; inner spur of hind tibia much shorter than half the basitarsus

   4. **imitatus** (Cresson).

6. Inner spur of of middle tibia much longer than half the middle basitarsus; inner spur of posterior tibia at least half as long as the posterior basitarsus; scutellum strongly margined at apex; ovipositor sheaths only a little longer than the abdomen ..... 5. **texanus** (Cresson).

Inner spur of middle tibia not distinctly more than half as long as the middle basitarsus; inner spur of posterior tibia distinctly less than half the posterior basitarsus; scutellum very weakly margined at apex; ovipositor sheaths about, or very nearly, as long as the body
6. **sanctus** Say.

7. First, second, and most of the third abdominal tergites closely evenly striate; parapsidal furrows sharply impressed and finely foveolate; face short and very broad; abdomen red or testaceous, the first tergite never black---8.
First, second, and third tergites not so completely striate or at least not combining the above characters---9.
8. Head and thorax black; legs mostly blackish---7. **aciculatus** (Ashmead).
Head, thorax, and legs testaceous---8. **abdominalis**, new species.
9. Parapsidal furrows completely wanting; mesoscutum with a more or less pronounced median longitudinal impression posteriorly; abdomen polished, the first tergite sculptureless and without two distinct dorsal longitudinal keels; propodeum smooth, with only a more or less distinct median area; second cubital cell large, subtriangular, sessile; face never rostriform; inner spur of posterior tibia usually distinctly half as long as the basitarsus; anterior and middle legs black; posterior coxae and trochanters usually black---10.
Parapsidal furrows usually at least indicated, rarely wanting, and then not exhibiting the above combination of characters---11.
10. Head and thorax entirely black; wings strongly infumated
9. **rufofemoratus**, new species.
Head varying from black to mostly ferruginous; thorax yellowish ferruginous, with the pectus sometimes black; wings very weakly dusky
10. **azygos** (Viereck).
11. First abdominal tergite with two more or less prominent widely separated dorsal longitudinal keels which arise at the outer margin of the basal impression and extend posteriorly; abdomen always red or testaceous; anterior and middle legs nearly always mostly black or blackish, very rarely (*tenuiceps*) yellow; metapleura and posterior coxae never evenly granular; parapsidal furrows more often smooth than foveolate, sometimes very weak or even wanting; wings usually dark---12.
First abdominal tergite rarely with such dorsal longitudinal keels, and then the abdomen is mostly black or the basal abdominal tergites, the metapleura, and posterior coxae are finely granular; anterior and middle legs very rarely black beyond the trochanters, and then the abdomen is mostly black; parapsidal furrows usually sharply impressed and finely foveolate or punctate; wings often hyaline or nearly---27.
12. Propodeal spiracles exceptionally large, greatly elongated, slitlike, less than their length from the anterior margin of propodeum; antennae 45 to 55 segmented; first abscissa of mediella much shorter than the second; ovipositor sheaths about as long as the abdomen; a large species, usually 7 to 10 mm. long---11. **spiracularis**, new species.
Propodeal spiracles normal, round or oval---13.
13. First abscissa of mediella distinctly longer than the second; nervellus strongly angled outwardly at or above its middle and emitting a distinct discoidella from this angle; parapsidal furrows impressed and nearly always finely foveolate; mesopleural furrow foveolate and extending to the middle of mesepisternum or beyond; black, with propodeum, metapleura, and abdomen red or reddish testaceous; posterior coxae, trochanters, and femora red---12. **simillimus** (Cresson).

Venation of hind wing not as above; parapsidal furrows nearly always entirely polished; mesopleural furrow smooth, not foveolate, usually very weak ---------- 14.

14. Face elongate, rostriform or subrostriform, usually fully as long from antennal foramina to apex of clypeus as broad; clypeus long; malar space not strongly inclining inwardly and usually at least two-thirds as long as the eyes; cheeks not bulging; head strongly hollowed out behind; third segment of labial palpi not especially short ---------- 15.

Face not elongate, distinctly broader than long from antennal foramina to apex of clypeus; clypeus twice as broad as long; malar space strongly inclining inwardly and usually much shorter; third segment of labial palpi usually much reduced, sometimes minute ---------- 19.

15. First abdominal tergite polished, not striate between the dorsal keels; second and following tergites also polished; thorax mostly testaceous; the mesoscutum always testaceous; propodeum usually smooth, not completely areolated, with only a long narrow median area and indistinctly defined basal lateral areas ---------- 16.

First abdominal tergite usually striate or striato-granular; if smooth, then mesoscutum is more or less black; thorax varying from mostly testaceous to entirely black; propodeum usually more completely areolated with the transverse apical carina nearly always distinct ---------- 17.

16. Antenna normally 34 to 36 segmented; parapsidal furrows indicated, the mesonotal lobes weakly defined; the ridge between antennae prominent and descending rather abruptly behind; first abscissa of mediella slightly shorter than the second; legs completely black ---- 13. **atripes** (Cresson).

Antenna normally 25 to 29 segmented; parapsidal furrows wanting, the lobes not defined; the ridge between antennae not so high nor descending abruptly behind; first abscissa of mediella rarely distinctly shorter than the second; legs usually more or less marked with yellow

14. **nigripes** (Cresson).

17. First abdominal tergite, usually the second, and sometimes the third, more or less striate or striato-granular; propodeum usually rather completely areolated, with two nearly parallel median longitudinal carinae enclosing a long narrow median area and the petiolarea, and with the basal lateral and apical lateral areas usually delimited; wings uniformly infumated; thorax usually more or less red ---------- 18.

First abdominal tergite smooth and polished, with the two dorsal keels usually not extending to the middle of the tergite; propodeum mostly smooth, with a broad poorly defined median area that is open behind; petiolarea and lateral areas not delimited; wings very nearly hyaline; thorax entirely black; first abdominal tergite black except at apex

15. **bakeri**, new species.

18. Antennae stout at base, tapering distinctly to the apex; first abdominal tergite fully as broad at apex as long and longitudinally wrinkled; remainder of abdomen polished; thorax stout; elevated lines on propodeum very prominent; length normally about 7 to 8 mm.

16. **crassicornis**, new species.

Antennae slender, not tapering to the apex; second and third abdominal tergites sometimes more or less sculptured; length usually 3.5 to 5 mm.

17. **perforator** (Provancher).

19. First abscissa of mediella distinctly shorter than the second; parapsidal furrows sharply impressed, the middle mesonotal lobe prominently elevated; propodeum regularly areolated, the separating carinae prominent, the areas usually smooth within; third segment of labial palpi extremely short, sometimes indistinct; antennae usually 35 to 40 segmented; thorax black, with propodeum and metapleura nearly always red ..... 20.

First abscissa of mediella rarely distinctly shorter than the second; parapsidal furrows usually weakly impressed, the middle mesonotal lobe not prominently elevated; propodeum usually not so regularly areolated or the areas rugose within; third segment of labial palpi short but nearly always distinct and longer than broad; antennae usually 23 to 33 segmented, rarely with as many as 36 segments; color of thorax varying from entirely black to entirely testaceous ..... 22.

20. Posterior trochanters black; hind wings not completely infumated, the area behind the mediella being usually mostly hyaline
18. **calcaratus**, (Cresson).

Posterior trochanters red, very rarely a little infuscated; hind wings uniformly infumated ..... 21.

21. Apical segment of all tarsi yellow; second cubital cell strongly petiolate, the petiole considerably longer than the first abscissa of radius
19. **usitatus** Gahan.

All tarsi entirely black or blackish; second cubital cell nearly sessile, the petiole, if distinct, not longer than the first abscissa of radius
20. **difficilis**, new species.

22. Head unusually thin antero-posteriorly, the temples receding sharply; parapsidal furrows not at all distinct; anterior and middle legs yellow; head, thorax, and abdomen testaceous ..... 21. **tenuiceps**, new species.

Head not especially thin, the temples not receding sharply; parapsidal furrows more or less distinctly indicated; anterior and middle legs blackish; head and thorax usually more or less black ..... 23.

23. Propodeum neither areolated nor rugose, mostly smooth, only slightly roughened down the middle; dorsal face of propodeum long, not rounded anteroposteriorly; pleura conspicuously pubescent; antennae usually 33 to 36 segmented; dorsum of thorax usually mostly red; mesopleura and pectus black; posterior coxae and trochanters more or less blackish
22. **ninanae**, new species.

Propodeum more or less distinctly areolated or rugose, rarely mostly smooth, and then the dorsal face short and strongly rounded; at least not agreeing entirely with the above characters ..... 24.

24. Posterior coxae, trochanters, and femora uniformly reddish testaceous; mesonotum always black ..... 25.

Posterior trochanters, usually at least the base of the hind femora and more or less of the hind coxae, black or blackish; thorax varying from entirely black to entirely red or reddish testaceous; the mesonotum often pale ..... 26.

25. Antenna normally 32 to 36 segmented; parapsidal furrows very weak anteriorly; temples bulging slightly but very narrow; propodeum and metapleura nearly always red ..... 23. **acrobasidis** Cushman.

Antenna normally 27 to 29 segmented; parapsidal furrows sharply impressed anteriorly; temples not very narrow; usually the propodeum, and often the metapleura, black ..... 24. **erythrogaster** Viereck.

26. Antenna normally 23 to 27 segmented; propodeum and metapleura usually red; very often mesopectus, mesopleura, and more or less of propleura red; mesoscutum always black or blackish; second abdominal tergite often mostly striate ..... 25. **buttricki** Viereck.

Antenna normally 29 to 33 segmented; thorax varying from entirely black to entirely reddish testaceous; propodeum and pectus rarely pale, and then the mesoscutum is always testaceous; second tergite never mostly striate ..... 26. **bicolor** (Provancher).

27. First abdominal tergite, often the second, and sometimes the third finely evenly granular or faintly reticulate; metapleura and hind coxae often finely granular and opaque ..... 35.

First abdominal tergite usually, and sometimes the second, more or less longitudinally striate or rugulose, never evenly granular; metapleura never evenly granular ..... 28.

28. Malar space short, distinctly less than half as long as the eyes; clypeus only slightly convex, short and broad, more than twice as broad as long; face rather flat; clypeal foveae not below the level of the lower margin of the eyes; occiput not strongly excavated ..... 33.

Malar space about half, or more than half, as long as the eyes; clypeus usually long and strongly convex, sometimes elevated anteriorly; clypeal foveae nearly always below the level of the lower eye margin; head strongly hollowed out behind ..... 29.

29. Thorax testaceous or ferruginous, with the propodeum and pectus sometimes more or less black; abdomen at most black apically; second and following tergites completely polished; face very broad, not rostriform ..... 30.

Thorax entirely black; abdomen usually black or with the second segment ferruginous, rarely abdomen mostly ferruginous; second abdominal tergite often more or less rugulose or irregularly striate; face usually rostriform or subrostriform ..... 31.

30. Posterior tibiae with a flange like expansion outwardly at apex; posterior basitarsus distinctly less than half as long as posterior tibia; upper margin of eyes distinctly below the vertex; propodeum finely rugulose, with two more or less distinct widely-separated median longitudinal carinae; all coxae testaceous; ovipostor sheaths a little longer than the body ..... 27. **laticeps**, new species.

Posterior tibiae without such apical expansion; posterior basitarsus more than half as long as posterior tibia; eyes attaining the vertex; propodeum rugose, without a distinct elongate median area; anterior and middle coxae blackish; ovipositor sheaths distinctly shorter than the body ..... 28. **terminatus** (Cresson).

31. Labial palpi short, the third segment very short and much narrower than the fourth; tarsal claws with a large broad basal tooth; second cubital cell triangular, the second abscissa of radius usually not distinct; malar space usually about half as long as the eyes; first and second abdominal tergites nearly always closely ruguloso-striate; wings nearly hyaline; abdomen varying from entirely black to mostly ferruginous ..... 29. **gibbosus** Say.

Labial palpi elongate, the third segment not especially short and narrow; tarsal claws with the basal tooth small or indistinct; second cubital cell usually four-sided, the second abscissa of radius usually distinct though short; malar space usually three-fourths as long as the eyes; first abdominal tergite usually more or less striate, the second sometimes irregularly striate; abdomen black, very rarely the second tergite tinged with reddish ..... 32.

32. Antenna normally 22 to 23 segmented; length 4 to 6 mm.; tarsal claws with basal tooth not at all distinct; ovipositor sheaths as long as the body
30. **brevicornis**, new species.

Antenna normally 25 to 27 segmented; length, 2.5 to 4 mm.; tarsal claws with basal tooth weak but distinct; ovipositor sheaths shorter
31. **tibiator** (Provancher).

33. Temples with a prominent bulge or rounded tubercule; scutellum more or less distinctly carinately margined at apex; propodeum with two median longitudinal carinae setting off a long narrow median area; all coxae entirely yellow; wings hyaline; color of the head, thorax, and abdomen varying from entirely black to entirely testaceous
32. **annulipes** (Cresson).

Temples without such a bulge, receding strongly; otherwise, not the above combination of characters ..... 34.

34. Abdomen stout; first abdominal tergite much broader at apex than the second is long; the second tergite broader than long, in the female nearly twice as broad as long, completely polished; color of the abdomen varying from entirely testaceous to black with the second and third tergites pale; face usually more or less testaceous; the superior orbits narrowly ferruginous even when the head is otherwise entirely black
33. **carpocapsae** Cushman.

Abdomen slender; first abdominal tergite not distinctly broader at apex than the second tergite is long; second tergite usually about as long as broad and usually weakly striate; abdomen black, with more or less of the second tergite usually yellowish; head black, the superior orbits not pale
34. **laticinctus** (Cresson).

35. Propodeum very finely evenly granular like the first adbominal tergite, and without carinae; head, thorax, and abdomen uniformly yellow
35. **immaculatus** Gahan.

Propodeum more or less rugose, more coarsely sculptured than the first abdominal tergite, or with two median longitudinal carinae ..... 36.

36. Face elongate, subrostriform; head strongly hollowed out behind; thorax depressed, hardly higher than broad; propodeum mostly granular, with two conspicuous very slightly divergent median longitudinal carinae; propleura mostly and the metapleura closely granular and opaque; antenna normally 26 to 30 segmented; head and thorax black; abdomen black, with the second segment more or less rufous; all coxae black; remainder of legs ferruginous ..... 36. **rubripes** (Cresson).

Face not subrostriform; head only very slightly hollowed out behind; antenna usually more than 30 segmented; at leas tnot agreeing entirely with the above ..... 37.

37. Posterior femora black or blackish; all coxae black; head, thorax, and abdomen wholly black, the second abdominal tergite rarely more or less brownish ..... 38.

Posterior femora reddish testaceous ..... 39.

38. Second and base of third abdominal tergites closely granular and opaque; tegulae black; basal segment of all trochanters black; abdomen completely black, the second tergite not at all brownish
37. **nigricoxus** (Provancher).

Second and third tergites polished, the second with a faint suggestion of reticulation, and sometimes more or less brown; tegulae yellow; all trochanters entirely yellow ..... 38. **coleophorae** Rohwer.

39. All coxae black; first abdominal tergite very faintly reticulately sculptured and strongly shining; second and following tergites polished; malar space at least half as long as the eyes; head and thorax black; abdomen black, with second and usually base of third tergites brownish; ovipositor sheaths nearly as long as the body
39. **californicus**, new species.

Anterior and middle coxae very rarely black and then not agreeing entirely with the above ..... 40.

40. First abdominal tergite completely black; the second usually more or less yellowish; the third and following entirely black; head and thorax always black; antenna usually 30 to 36 segmented
40. **cinctus** (Cresson).

First and second tergites, and sometimes more, of the abdomen red; rarely the first tergite partly blackish; head and thorax sometimes varied with ferruginous or testaceous ..... 41.

41. Head black with more or less of the clypeus usually reddish yellow; thorax entirely black; propleura rugulose anteriorly, polished behind; abdomen usually with the apical half of third and all of the following tergites black
41. **agilis** (Cresson).

Head usually mostly testaceous; thorax varying from entirely black to entirely yellowish ferruginous; propleura usually evenly granular, not rugulose anteriorly ..... 42. **discolor** (Cresson).

1. BASSUS MARGINATIFRONS, new species

Female.—Length, 8.5 mm. Face apparently a little broader than long from antennal foramina to apex of clypeus, with a small, shallow, median impression just below antennae; malar space less than half the eye height; maxillary palpi rather long, the two basal segments somewhat thickened, the three apical segments slender; labial palpi stout, the third segment exceedingly small, scarcely apparent; eyes large, prominent, broadly oval, attaining the vertex, which is not at all convex; frontal impressions distinctly carinate, a carina arising at each side near the eye and extending toward the lateral ocelli, but bending sharply downward before attaining the latter, and converging below the median ocellus; ocelli prominent; ocell-ocular line fully twice as long as the diameter of an ocellus; occiput flat, not excavated; antennae long, stout, tapering slightly, 51-segmented in type all the flagellar segments longer than broad; thorax rather slender, distinctly deeper than broad, mesonotal lobes prominent, defined by distinct, polished parapsidal grooves; the middle lobe with a weak median longitudinal ridge: scutellum slightly convex, with a transverse impression just before apex and the apex margined by an irregular carina; suture in front of scutellum deep and broad, divided into two pits by a median septum; propodeum polished, with a short basal median carina which divides to set off a long, narrow, triangular areola; basal lateral areas not delimited; lateral longitudinal carinae and apical transverse carina prominent; petiolarea defined; propodeal spiracle rather large, elliptical; propleura completely polished; mesopleura polished, with a broad, coarsely foveate longitudinal furrow;

metapleura polished; stigma long and narrow, with radius arising from beyond its middle; areolet large, sessile, triangular; second intercubitus weakly bent near the middle; nervulus practically interstitial; first abscissa of mediella much shorter than the second; nervellus slightly bent inwardly below; discoidella not distinct; legs slender; posterior coxae rather long, polished; inner spur of middle tibia a little longer than half the basitarsus; inner spur of hind tibia just about equal to half the posterior basitarsus; hind tarsi slender, the third segment distinctly longer than the fifth; abdomen slender, first tergite nearly twice as long as broad at apex, very narrow at base, completely polished, with an impression at base and a low polished median longitudinal ridge arising behind this impression, the latter not sharply margined by carinae; second and following tergites polished; second tergite about as long as broad; ovipositor sheaths a little longer than the body. Testaceous; head and antennae black, palpi pale; area between clypeal foveae and eyes rufous in type; propectus margined with blackish; otherwise thorax wholly testaceous; abdomen wholly testaceous; wings strongly infumated; anterior and middle legs entirely testaceous, with only tarsal claws blackish; posterior legs testaceous, with the trochanters, apex of tibiae, and the tarsi blackish.

Type.—Cat. No. 28679, U.S.N.M.

Type locality.—Pyziton, Clay County, Alabama.

Described from a single specimen collected by H. H. Smith.

2. BASSUS FLORIDANUS, new species

Male.—Length, 9 mm. Face broader than long from antennal foramina to apex of clypeus, with a slight median incision just below antennae; clypeus broad, only slightly convex, truncate at apex; palpi as in *marginatifrons;* eyes rather large, attaining the vertex, which is not at all convex; frontal impressions margined by carinae as described for *marginatifrons;* ocell-ocular line about twice the diameter of an ocellus; occiput flat, not excavated; antennae rather stout, 51-segmented in type, all the flagellar segments longer than broad; thorax slender, not as broad as high; pronotal pits large, deep, and sharply margined; parapsidal furrows impressed, polished; middle lobe of mesoscutum very prominent, with a low polished ridge down the middle; scutellum a little convex, polished, margined at apex by a distinct carina; propodeum coarsely, rather regularly, areolated, the areas rugose within; petiolarea not distinctly separated from the areola; the basal, middle, and apical lateral areas sharply delimited; propodeal spiracle large, elliptical; propleura polished; mesopleural furrow coarsely foveate; metapleura rugose-reticulate; stigma long and narrow; radius arising from beyond middle of stigma; areolet large, triangular, sessile; nervulus slightly postfurcal; first

abscissa of medella shorter than the second; nervellus not angled, slightly curved inwardly below; legs rather slender; hind coxae long; inner spur of middle tibia not distinctly longer than half the middle basitarsus; inner spur of hind tibia much longer than the outer and just about half as long as posterior basitarsus, third segment of hind tarsi distinctly longer than the fifth; abdomen rather narrow; first tergite very narrow at base, much longer than broad at apex, and with a deep triangular pit at base which is margined by sharp ridges that unite behind to form a prominent median longitudinal keel extending to the apical third of the tergite; on either side of this keel the tergite is rugose; second and following tergites polished. Ferruginous; head and antennae entirely black; palpi blackish or dusky except at tips; thorax, except the propectus which is black, red; wings strongly infumated; anterior and middle legs black, except the anterior tarsi which are yellowish and the middle tarsi which are brownish; posterior coxae and femora red; posterior trochanters, tibiae, and tarsi black; abdomen wholly red.

Type.—Cat. No. 28680, U.S.N.M.

Type locality.—Biscay Bay, Florida.

Described from a single male specimen. Undoubtedly additional material will exhibit some variation in the extent of the black markings of the thorax, and the female will probably be found to have darker anterior tarsi than the type.

3. BASSUS NIGROTROCHANTERICUS (Viereck)

Microdus nigrotrochantericus VIERECK, Trans. Kansas Acad. Sci., vol. 19, 1905, p. 275.

Type.—In the University of Kansas.

Exceedingly close to *imitatus* (Cresson) and possibly the same species. Because of the lack of intergrading forms, however, it seems best to hold it distinct for the present. The unique type differs principally from that of *imitatus* by the characters noted in the key, but these differences are found to vary more or less in related species which are represented by more material, and may prove inadequate for the separation of *nigrotrochantericus* from *imitatus*.

Face a little broader than long to the apex of clypeus; head flat behind; eyes attaining the vertex; thorax slender; parapsidal grooves impressed, polished, not foveolate; the middle lobe of mososcutum with a low polished longitudinal median ridge; furrow in front of scutellum not distinctly pitted; scutellum weakly carinate at apex; propodeum rather evenly rounded from base to apex, with a low polished median longitudinal ridge and a weak irregular carina adjoining this ridge on either side; propleura completely polished; mesopleura polished with a short weakly foveolate longitudinal furrow; metapleura smooth, weakly punctate; inner spur of middle tibia about half as

long as middle basitarsus; inner spur of hind tibia slightly less than half the posterior basitarsus, which is distinctly longer than the remaining segments of hind tarsi combined; radius arising from a little beyond middle of stigma; areolet large, subtriangular, sessile; first abscissa of mediella considerably shorter than the second; abdomen very slender, narrower than thorax, completely polished; first tergite long and narrow, nearly twice as long as broad at apex; the basal impression on first tergite not completely margined and the median elevation behind this impression short and not prominent, not developed into a sharp keel; second tergite about as long as broad at apex; ovipositor sheaths considerably longer than the body; hypopygium very slightly surpassing apex of last dorsal segment. Head entirely black; thorax yellow-ferruginous, except the propectus which is black; anterior and middle legs black, posterior coxae and femora red, their trochanters, tibia, and tarsi black; wings strongly infumated; abdomen yellowish ferruginous.

The foregoing notes are based on the type, the only known specimen, which is from Douglas County, Kansas.

4. BASSUS IMITATUS (Cresson)

Microdus imitatus CRESSON, Canad. Ent., vol. 5, 1873, p. 51.

Type.—No. 1721, Academy of Natural Sciences, Philadelphia, Pennsylvania.

Very similar to *nigrotrochantericus* as noted under that species. In addition to the differences included in the key, the type of *imitatus*, which is the only specimen of this species that I have seen, differs from *nigrotrochantericus* in the more extensive black markings of the thorax. The prothorax is entirely black, and the sutures surrounding the scutellum and the mesopectus are black. This coloration, however, doubtless varies more or less. The species can at once be separated from *sanctus* by the decidedly more slender thorax and abdomen, the considerably longer ovipositor, the weaker sculpture of the propodeum, and the ferruginous mesonotum and mesopleura. The antennae are 41-segmented in the type and apparently taper less strongly than in *sanctus*.

Recorded only from Massachusetts.

5. BASSUS TEXANUS (Cresson)

Microdus texanus CRESSON, Trans. Amer. Ent. Soc., vol. 4, 1872, p. 181.

Type.—No. 1723, Academy of Natural Sciences, Philadelphia, Pennsylvania.

This species is very similar to *sanctus*, but can be rather easily separated by the longer tibial spurs and the shorter ovipositor. The thorax in general is more compact, appearing shorter and distinctly

deeper, and the propodeum is more strongly areolated than in most specimens of *sanctus*, the separating carinae being very prominent; the scutellum is usually shorter and broader in *texanus* and has the apical carina much more strongly developed.

Head rather flat behind; eyes prominent, attaining the vertex; third segment of labial palpi minute; antennae about 40 to 46 segmented; parapsidal furrows strongly impressed, the mesonotal lobes prominent; propodeum coarsely regularly areolated, the median area elongate-subtriangular, separated from the petiolarea; the lateral areas well defined; mesopleural furrow usually broad and coarsely foveate; the nervulus in the anterior wing varies from interstitial with the basal vein to distinctly postfurcal; first abdominal tergite with a small deep basal impression, which is usually not completely margined by prominent carinae; the median longitudinal ridge behind this basal impression varies from very weak to very prominent; ovipositor sheaths only a little longer than the abdomen. Head and thorax black, the propodeum and metapleura varying from red to black; anterior and middle legs black, their tarsi usually yellowish in the male; posterior trochanters and tarsi black; posterior tibiae varying from entirely black to almost entirely red; wings strongly infumated; abdomen red.

The above notes are based on the following material: The type, which is from Texas, and three additional specimens, one from Illinois and two from Georgia, in the Philadelphia Academy of Sciences; one specimen, collected by C. W. Johnson at Danbury, Vermont, in the Boston Society of Natural History collection; and more than 40 specimens in the United States National Museum, which are from various localities in Texas, Louisiana, Georgia, Florida, Alabama, Mississippi, Virginia, North Carolina, Maryland, New York, Iowa, and British Columbia.

Nothing is known of the host relationships of this species.

6. BASSUS SANCTUS Say

Bassus sanctus SAY, Boston Journ. Nat. Hist., vol. 1, 1836, p. 249.

Type—Lost.

As pointed out in the discussion under *texanus*, *sanctus* is very similar to that species, but may be readily separated by the differences there mentioned. The brief general characterization of *texanus* given above will apply to *sanctus*, with the following exceptions: Propodeum usually less coarsely areolated, the lateral areas sometimes not distinctly defined; mesopleural furrow usually narrow and more weakly foveolate; nervulus interstitial with basal vein or very slightly antefurcal; ovipositor sheaths about as long as the body or very nearly; propodeum and metapleura always yellowish ferruginous.

The more important differences between *sanctus* and *imitatus* are mentioned in the dicussion of the latter species.

The following material of *sanctus* has been examined: Several specimens in the Philadelphia Academy of Sciences from New Jersey, Virginia, Louisiana, Texas, and Georgia; a single specimen in the collection of the Boston Society of Natural History, from Westport, Massachusetts (C. W. Johnson); six specimens from Illinois in the collection of the University of Illinois; and 16 specimens in the United States National Museum, from Michigan, Illinois, Indiana, Ohio, West Virginia, North Carolina, Louisiana, Kansas, and Connecticut. There is also one specimen at the Gipsy Moth Laboratory, Melrose Highlands, Massachusetts, recorded as reared from a larva of *Pyrausta pertextalis* Lederer, from Bedford, Massachusetts.

7. BASSUS ACICULATUS (Ashmead)

Microdus aciculatus ASHMEAD, Proc. U. S. Nat. Mus., vol. 11, 1889 (1888), p. 639.

Type.—In the United States National Museum.

Closely resembles *abdominalis*, from which it differs most conspicuously in having the head and thorax black and the legs more or less blackish. Face much broader than long to the apex of clypeus; malar space about half the eye height; temples distinctly bulging a little, not strongly receding as is *abdominalis*; third segment of labial palpi minute; antennae very slender; parapsidal grooves sharply impressed, minutely foveolate; middle mesonotal lobe prominent anteriorly; propodeum rugulose, not distinctly areolated; mesopleural furrow smooth; posterior tibiae strongly thickened at apex and with numerous short stout spines above the outer terminal spur; inner spur of hind tibia a little less than half the basitarsus; last segment of hind tarsi longer than the third; second cubital cell subsessile or shortly petiolate; first abscissa of mediella about as long as the second; first abdominal tergite slightly longer than broad at apex and provided with two widely separated dorsal longitudinal keels; first, second, and most of third tergites closely longitudinally aciculate; ovipositor sheaths longer than the abdomen but shorter than the body. Head and thorax black; abdomen ferruginous; all coxae and trochanters black or blackish; rest of legs mostly reddish brown, more or less tinged with blackish; wings weakly infumated.

Known only from the type series, which is from Texas.

8. BASSUS ABDOMINALIS, new species

Very similar to *aciculatus* in habitus and sculpture, but at once distinguished by the testaceous head and thorax and pale legs.

Female.—Length, 5 mm. Head strongly transverse; face much broader than long to the apex of clypeus, rather flat; eyes short oval; malar space usually distinctly more than half as long as the eyes;

labrum short and broad, broadly truncate at apex; labial palpi short; the third segment minute, sometimes indistinct; frontal impressions shallow, immargined; occiput not strongly excavated; temples very narrow, strongly receding; antennae very slender, about as long as the body, 36-segmented in the type; pronotal pits shallow, not margined; parapsidal furrows sharply impressed, very finely punctate, the lobes well set off, the middle lobe prominent; furrow in front of scutellum pitted; scutellum smooth, slightly convex, not margined at apex; propodeum rugulose, usually not distinctly areolated; propodeal spiracle small, short oval; pleura polished; mesopleural furrow narrow, smooth, or finely foveolate; posterior coxae longer than broad, polished; inner spur of hind tibia slightly longer than the outer and nearly half as long as the basitarsus; apical segment of hind tarsi about as long as the third; radius arising from about the middle of stigma; areolet triangular, subpetiolate, or with a short petiole; nervulus postfurcal; first abscissa of mediella about as long as the second, sometimes faintly shorter; nervellus usually a little angled or curved above the middle; abdomen about as long as the head and thorax combined; first tergite longer than broad at apex, only slightly impressed at extreme base, rather evenly striate, and with two more or less distinct dorsal longitudinal keels on the basal half; second and third tergites each with a transverse impression, the second entirely and the third except at apex closely longitudinally aciculate; tergites beyond the third very short; ovipositor sheaths a little shorter than the body. Head, thorax, and abdomen entirely ferrugino-testaceous; antennae brownish black; legs uniformly yellowish ferruginous, apex of hind tibiae and the hind tarsi more or less blackish; wings weakly infumated.

Male.—Essentially as in the female.

Type.—Cat. No. 28681, U.S.N.M.

Type locality.—Louisiana.

Described from seven females and six males, labeled "Loui., Collection C. F. Baker." In addition to the type series the National Museum has one specimen from Opelousas, Louisiana, and one from Jacksonville, Florida.

9. BASSUS RUFOFEMORATUS, new species

Distinguished particularly by the complete absence of parapsidal furrows, the polished propodeum, the completely polished abdomen, and the large sessile second cubital cell.

Female.—Length, 6.5 mm. Face rather flat, polished, distinctly broader than long to the apex of clypeus; a slight median incision on face below antennae; eyes large, attaining the vertex which is not transversely convex; malar space much less than half the eye-height; clypeus at least twice as broad as long; third segment of labial palpi

not greatly reduced, more than half as long as the second or fourth segments; frons only very slightly impressed; ocell-ocular line about twice as long as the diameter of an ocellus; head only slightly hollowed out behind; temples not swollen, receding gradually behind the eyes; antennae rather stout, broken, 28 segments remaining; scape large and stout; pronotal pits rather large; mesoscutum completely polished, the parapsidal furrows entirely wanting; a conspicuous median longitudinal impression posteriorly on mesoscutum; furrow in front of scutellum with several distinct pits; scutellum slightly convex, polished, not margined at apex; propodeum polished, with two median carinae which meet before attaining the apex; propodeal spiracle small, short oval; pro, meso, and meta pleura completely polished; mesopleural furrow only weakly indicated, smooth; posterior coxae large, elongate; inner spur of hind tibia about half as long as the basitarus; second cubital cell large, subtriangular, sessile; first abscissa of mediella slightly shorter than the second; nervellus straight; discoidella entirely wanting; abdomen fully as long as the head and thorax combined, completely polished; first tergite about as broad at apex as long, without two distinct dorsal longitudinal keels; second and third tergites nearly twice as broad as long, each with a weak, smooth, transverse impression; ovipositer sheaths longer than the abdomen, but shorter than the body. Head and thorax entirely black; the palpi whitish, black at base; anterior and middle legs black, their tarsi brown with the apical segment yellowish; posterior coxae and trochanters black, their femora entirely red, their tibiae and tarsi blackish; wings strongly infumated; abdomen red.

Type.—Cat. No. 28685, U.S.N.M.

Type locality.—Lawrence, Kansas.

Described from a single specimen collected by Hugo Kahl, July 8, 1896.

10. BASSUS AZYGOS (Viereck)

Lytopylus azygos VIERECK, Trans. Kans. Acad. Sci., vol. 19, 1905, p. 267.
Microdus agathoides VIERECK, Trans. Kans. Acad. Sci., vol. 19, 1905, p. 277.

Type.—The holotypes of both *azygos* and *agathoides* are in the collection of the University of Kansas.

A comparison of the type specimens shows conclusively that they are conspecific. No importance can be attached to the slight color differences in view of the variations in color found in related forms. Face distinctly broader than long, polished; malar space about half as long as the eyes; frontal impressions immargined; temples gradually receding; parapsidal furrows wanting; mesoscutum with a slight median longitudinal impression posteriorly; propodeum mostly smooth with a rather large median area that is open behind, and

a median longitudinal carina on the posterior third; mesopleural furrow very weakly impressed, polished; inner spur of posterior tibia fully half as long as the basitarsus; apical segment of hind tarsi very large, about as long as the second segment; second cubital cell large, triangular, sessile, both intercubiti straight; first abscissa of mediella about as long as the second; nervellus straight; discoidella entirely wanting; abdomen completely polished; the first tergite without dorsal longitudinal keels and entirely sculptureless, about as broad at apex as long. Head varying from almost entirely testaceous to entirely black; thorax testaceous, usually with the pectus more or less black; anterior and middle coxae and trochanters and the posterior trochanters black; posterior coxae varying from mostly reddish testaceous to entirely black; fore and middle femora, tibiae, and tarsi more or less brownish, the femora sometimes blackish basally; posterior femora testaceous; their tibiae and tarsi blackish; wings very faintly dusky; abdomen testaceous.

The above notes are based on the two holotypes, both of which are from Morton County, Kansas, at 3,200 feet elevation.

11. BASSUS SPIRACULARIS, new species

Very easily distinguished by the exceptionally large, almost slitlike, propodeal spiracles.

Female.—Length 9 mm. Face broader than long, finely punctate; malar space much less than half the eye height; third segment of labial palpi stout, not greatly reduced as in *texanus*, which species *spiracularis* closely resembles superficially; eyes large, attaining the vertex; a more or less prominent median ridge between the antennae; frontal impressions not margined; ocelli situated on a slight elevation above the rest of the vertex; ocell-ocular line about twice as long as the diameter of an ocellus; antennae long, tapering gradually to the apex, 51-segmented in the type; scape stout, distinctly shorter than the first flagellar segment; pronotal pits large and deep, margined by sharp carinae; parapsidal furrows strongly impressed, smooth or weakly foveolate; the middle mesonotal lobe prominent, with two faint median longitudinal impressions; furrow in front of scutellum broad and deep, with several pits usually distinctly separated; scutellum convex, polished, not margined at apex; propodeum areolated, the carinae except the transverse apical carina prominent; the median area long and narrow, sometimes confluent with the petiolarea; propodeal spiracle very large, nearly slitlike, and much less than its length from the anterior margin of the propodeum; propleura polished with a few oblique rugae anteriorly; mesopleura polished; mesopleural furrow coarsely foveolate; metapleura polished, somewhat rugose below; posterior legs slender; inner spur of hind tibia a little less than half the basitarsus; apical segment of the posterior tarsi slightly

shorter than the third; radius arising from about the middle of the stigma; areolet small, triangular, petiolate or subpetiolate; first abscissa of mediella much shorter than the second; nervellus not angled; abdomen as long as the head and thorax combined, entirely polished; the first tergite usually a little longer than broad at apex and provided with two prominent dorsal longitudinal keels which extend to the middle of the tergite or a little beyond, the area between these shallowly excavated; second tergite much broader than long; ovipositor sheaths about as long as the abdomen or very slightly longer. Head black, with a narrow reddish postorbital line; thorax black, the metapleura and propodeum usually red; anterior and middle legs black or blackish, the anterior tarsi brownish; posterior coxae and femora red, their trochanters, more or less of their tibiae, and their tarsi black; wings deeply infumated; abdomen red.

Type.—Cat. No. 28682, U.S.N.M.

Type locality.—Kanawha Station, West Virginia.

Described from two female specimens collected by S. A. Rohwer. In addition to the types the National Museum has a considerable number of specimens from a wild range of localities, including points in Virginia, Maryland, New Jersey, Pennsylvania, North Carolina, Ohio, Kentucky, Georgia, Texas, Nevada, and Washington. I have also seen four specimens from Illinois in the collection of the University of Illinois and a single specimen in the collection of the Boston Society of Natural History from Cambridge, Massachusetts (C. W. Johnson).

12. BASSUS SIMILLIMUS (Cresson)

Microdus simillimus CRESSON, Canad. Ent., vol. 5, 1873, p. 51.

Type.—No. 1772, Academy of Natural Sciences, Philadelphia, Pennsylvania.

This species is easily distinguished by the group of characters given in the key. There is a greater variation in size than is found in most species, specimens varying from 3.5 to 8 mm. occuring among the large amount of material examined. Face short and broad, much broader than long to the apex of clypeus; third segment of labial palpi very short, sometimes indistinct; cheeks broad, not strongly receding; temples full, but not bulging; frontal impressions very shallow; antennae usually 32 to 38 segmented, varying with the size of the specimen; parapsidal furrows impressed and nearly always distinctly foveolate; furrow in front of scutellum with several distinctly separated pits; propodeum rugose, not areolated, but usually with two median carinae that converge both anteriorly and posteriorly and set off a long narrow median area; dorsal aspect of propodeum usually long and only very slightly declivous; mesopleural foveolate; inner spur of hind tibia considerably less than half

the basitarsus; second cubital cell rather small, obliquely triangular, petiolated; radial cell very narrow; first abscissa of mediella always distinctly longer than the second; nervellus strongly angled above the middle and emitting a distinct discoidella from this angle; first abdominal tergite usually more or less striate and provided with two dorsal longitudinal keels which are usually short and sometimes are very weak; remainder of the abdomen smooth and polished; ovipositor sheaths nearly as long as the body. Head and thorax black, with the propodeum and metapleura testaceous or ferruginous; anterior and middle legs black or blackish; posterior coxae, trochanters, and femora reddish testaceous, their tibiae blackish at apex and their tarsi blackish; wings strongly infumated; abdomen red.

The above notes are based on the following material: The type, which is from Pennsylvania, specimens from New York, New Hampshire, Maryland, Pennsylvania, Virginia, Massachusetts, District of Columbia, Ohio, Illinois, Georgia, New Jersey, Iowa, and South Dakota, in the United States National Museum, and considerable material, all from Illinois, in the collection of the University of Illinois.

Hosts.—There is one specimen in the National Museum reared by R. A. Cushman as a parasite of *Lixus scrobicollis* Boheman at Vienna, Virginia; and another labeled "Reared from Mordellid? gallery in the stem of ragweed, Sioux City, Iowa, C. N. Ainslie." Probably this species will be found to attack various lepidopterous and coleopterous larvae living in the stems of herbaceous plants.

13. BASSUS ATRIPES (Cresson)

Agathis atripes Cresson, Proc. Ent. Soc. Phila., vol. 4, 1865, p. 296.

Type.—No. 1731, Academy of Sciences, Philadelphia, Pennsylvania.

Very similar to *nigripes* and sometimes difficult to distinguish from that species. However, the antennae are decidedly longer, being usually 34 to 36 segmented; the parapsidal furrows, although weak, are nevertheless suggested and distinctly set off the middle mesonotal lobe from the rest of the scutum; the ridge between the antennae is apparently always more prominent in *atripes* and decends rather abruptly behind; and all the specimens I have seen have the legs entirely black, without even reddish marks on the anterior femora and tibiae.

Face as long as broad, rostriform; malar space about as long as the eyes; cheeks distinctly concave; third segment of labial palpi not greatly shortened, more than half as long as the fourth; frontal impressions immargined; vertex short; temples bulging somewhat; head hollowed out behind; scutellum not margined at apex; propodeum mostly smooth and shining, with a long narrow median area

that narrows to a point at each end; mesopleural furrow weakly impressed, polished; spurs of hind tibia of about equal length and less than half as long as the basitarsus; areolet triangular, petiolate; first abscissa of mediella a little shorter than the second; abdomen smooth and polished; the first tergite with two prominent dorsal longitudinal keels; second and third tergites broad, with more or less distinct transverse impressions; ovipositor sheaths nearly as long as the body. Head black; thorax ferruginous, usually with the collar, lower part of propleura, and the pro and meso pectus black; all legs completely black; wings rather strongly infumated; abdomen entirely red.

These notes are based on only a small number of specimens: The type, which is from Colorado, and seven specimens in the National Museum from Colorado and New Mexico. Additional material may show a wider range of variations than has been indicated.

14. BASSUS NIGRIPES (Cresson)

Agathis nigripes CRESSON, Proc. Ent. Soc. Phila., vol. 4, 1865, p. 297.
Agathis nigriceps PROVANCHER, Natural. Canad., vol. 22, 1895, p. 96.
Agathis wyomingensis VIERECK, Trans. Kans. Acad. Sci., vol. 19, 1905, p. 284.

Type.—The type of *nigripes* is in the Philadelphia Academy of Science; that of *nigriceps* is in the Museum of Public Instruction in Quebec, Canada; and that of *wyomingensis* is in the University of Kansas.

Although I have not seen the type of *nigriceps* Provancher, the orignal description and notes on the type made by S. A. Rohwer leave no reasonable doubt that it is *nigripes* Cresson. The type of *wyomingensis*, which I have studied, is certainly conspecific with that of *nigripes* in my opinion.

The species is exceedingly close to *atripes*, but is undoubtedly distinct and separable on the basis of the characters mentioned in the discussion of *atripes*.

Head characters essentially the same as in *atripes*, except as noted in the key; the antennae are distinctly shorter, very slender, and not tapering to the apex, the apical segments of the female antennae shortened; parapsidal furrows wanting, the mesonotal lobes not defined; propodeum mostly smooth and polished, with a long narrow median area that narrows at both ends; basal lateral areas usually weakly defined; apical lateral areas rarely indicated; mesopleural furrow shallow, polished; second cubital cell triangular, petiolate; abdomen polished, the first tergite with two prominent dorsal longitudinal keels extending to the middle or beyond; ovipositor sheaths nearly as long as the body. Head black, the temples and cheeks and part of the face sometimes more or less ferruginous; thorax yellowish ferruginous, with the pro and meso pectus and part of the

propodeum more or less black or blackish; rarely the thorax is entirely testaceous; the duskiness or blackish coloring of propodeum usually restricted to the basal two-thirds, rarely covering entire propodum; wings infumated; legs usually black, often more or less varied with ferruginous, and in all the specimens examined the anterior femora are pale toward the apex, even when the legs are otherwise completely black; abdomen ferruginous.

The following material was studied and served as a basis for the above notes: The types of *nigripes* and *wyomingensis*, which are from Colorado and Wyoming, respectively; one specimen, in the collection of the Boston Society of Natural History, from Cohasset, Massachusetts; and 21 specimens, in the United States National Museum, which are from Colorado, Nevada, Washington, Oregon, California, New Mexico, Arizona, Kansas, and Rhode Island.

15. BASSUS BAKERI, new species

Most similar to *perforator*, but distinguished by the nearly hyaline wings, the much smoother propodeum, and the completely polished abdomen.

Female.—Length, 5 mm. Face subrostriform, smooth and shining; the malar space about three-fourths the eye height; clypeus strongly convex; third segment of labial palpi not greatly reduced, nearly as long as the second; frons polished, immargined; ocell-ocular line twice as long as the diameter of an ocellus; antennae slender, those of the type 25-segmented, the 10 apical segments quadrate, not longer than broad; mesoscutum smooth and polished; parapsidal furrows feebly indicated; furrow in front of scutellum deep, polished, divided into two pits by a median septum; mesopleural furrow very shallowly impressed, short, polished; metapleura mostly smooth, roughened only below; propodeum mostly smooth, not areolated, but with a short basal median carina which divides to form a broad areola that is open behind; petiolarea and lateral areas not at all defined; propodeum rounded anter-posteriorly; propodeal spiracles short oval; coxae polished; spurs of hind tibiae of apparently equal length and less than half as long as the basitarsus; apical segment of posterior tarsi about as long as the third; radius arising from the middle of the stigma; first abscissa of radius very short; first abscissa of mediella indistinctly shorter than the second; discoidella not distinct; abdomen about as long as the head and thorax combined; first tergite narrow at base, longer than broad at apex, and completely polished, with two short dorsal longitudinal keels that do not extend quite to the middle of the tergite; second tergite with a delicate, smooth, transverse furrow; suture between second and third tergites smooth; ovipositor sheaths as long as the body. Head and thorax entirely black; all coxae and trochanters, anterior femora basally, and the middle

and posterior femora entirely, black; tibiae varying from brown to blackish; all tarsi black or blackish; abdomen red; the first tergite black except at apex; wings only very faintly dusky, nearly hyaline.

Type.—Cat. No. 28684, U.S.N.M.

Type locality.—Colorado.

Described from two female specimens labeled "Colo. 2030, Collection C. F. Baker."

16. BASSUS CRASSICORNIS, new species

Most similar to *atripes*, but readily separated by the shorter antennae, the coarsely areolated propodeum, the wrinkled first tergite, and by the deeper red coloring of the thorax.

Female.—Length, 8 mm. Face long, rostriform, broadly elevated down the middle; malar space about equal to the eye height; clypeus long, nearly as long as the distance between the clypeal foveae, strongly transversely convex; the third segment of labial palpi about as long as the fourth; labrum large; frons polished, immargined; ocell-ocular line not more than one and one-half times the diameter of an ocellus; antennae 29-segmented in type, stout, tapering rather strongly to the tip, and but little longer than the head and thorax combined; the first flagellar segment longer than the scape, about three times as long as broad; the 10 or 12 apical segments only very little longer than broad; thorax stout, parapsidal furrows very weakly indicated, the lobes not prominent; the hind angles of mesoscutum produced into vertically compressed rounded lobes that are rather prominent; prepectal carina strong; prepectus descending abruptly; mesosternum scarcely longer than broad; mesopleural furrow broadly impressed but not at all foveolate; propodeum sloping gradually and only slightly, rather regularly areolated, the elevated lines prominent; propodeal spiracles short oval; metapleura smooth, rugose below; inner spur of hind tibia a little longer than the outer but less than half the basitarsus; apical segment of hind tarsi longer than the third; second cubital cell triangular, petiolate; first abscissa of mediella at least as long as the second; abdomen broadly sessile; first tergite fully as broad at apex as long, longitudinally wrinkled, and with two prominent dorsal longitudinal keels on the basal half; second tergite longer than the third and with a more or less distinct curved transverse impression, polished, the impression sometimes more or less foveolate; ovipositor sheaths about as long as the body. Head, including antennae and palpi, black; pro and meso pectus, tegulae, and wing bases black; remainder of thorax deep red; all legs black, immaculate; wings very deeply infumated; abdomen red.

Type.—Cat. No. 28683, U.S.N.M.

Type locality.—Gulfport, Florida.

Described from two female specimen labeled "Gulfport, Fla., 6–II." The paratype differs from the type only in having 30-segmented antennae and in having the mesopectus red.

17. BASSUS PERFORATOR (Provancher)

Agathis perforator PROVANCHER, Natural. Canad., vol. 12, 1880, p. 177, no. 3.
Agathis femorator PROVANCHER, Natural. Canad., vol. 12, 1880, p. 177, no. 4.
Bracon (Agathis) sassacus VIERECK, Bull. 22, Conn. Geol. and Nat. Hist. Survey, 1917 (1916), pp. 230 and 231.
Bracon (Agathis) branfordensis VIERECK, Bull. 22, Conn. Geol. and Nat. Hist. Survey, 1917 (1916), pp. 230 and 231.

Type.—The types of *perforator* and *femorator* are in the Museum of Public Instruction at Quebec, Canada; those of *sassacus* and *branfordensis* are in the collection of the agriculture experiment station at New Haven, Connecticut.

The types of *sassacus* and *branfordensis* which I have studied, are conspecific in my opinion; they were originally seperated on the basis of slight color differences, which are of no consequence. Unfortunately I have not seen the types of *femorator* and *perforator;* but from the original descriptions and notes on the types by S. A. Rohwer, and also from specimens compared with the types and determined as these species by Mr. Rohwer, it appears that they are not specifically distinct, and that they are in all probability the same as *sassacus* and *branfordensis*. Since *perforator* has line precedence over *femorator*, it is the valid name.

The material examined indicates that the species is most closely related to *nigripes*, but the basal abominal tergites are nearly always more or less sculptured; the propodeum is usually more completely aerolated; the parapsidal grooves are faintly indicated; and the thorax is generally darker, especially on the mesonotum; in size *nigripes* averages a little larger. The face is more or less lengthened being subrostriform, with the malar space rather long; antennae in the the material studied varying from 25 to 29 segmented, slender, not tapering to the apex; frons smooth, immargined; mesonotal lobes very faintly defined, the parapsidal grooves almost wanting; propodeum usually very faintly punctate and nearly completely aerolated with a long narrow median area and with the basal lateral and apical lateral areas nearly always distinct; mesopleural furrow smooth; second cubital cell triangular, with a short petiole; first abcissa of mediella about as long as the second; first abdominal tergite with two prominent dorsal longitudinal keels and more or less finely punctured or striato-punctate; second and third tergites often finely closely sculptured; ovipositor sheaths nearly as long as the body. Head black, often more or less varied with ferruginous; thorax varying from entirely black to almost entirely ferruginous; usually the thorax is black with the mesopleura and the metapleura mostly pale, but

all intergrades from entirely black to nearly entirely ferruginous occur; wings a little infumated; anterior and middle legs usually mostly black, the femora and tibiae often somewhat marked with reddish; posterior legs varying from almost entirely black to mostly ferruginous, most frequently being black, with the femora pale.

The above discussion is based on National Museum material from Canada, New York, Massachusetts, New Hampshire, Michigan, Wisconsin, South Dakota, and the District of Columbia; and several specimens in the collection of the Boston Society of Natural History, from Massachusetts and New Hampshire. This material exhibits unusual variability, both in color and sculpture, and I am not entirely satisfied that only one species is concerned; but the presence of practically all intergrades seems to indicate that this is the case.

18. BASSUS CALCARATUS (Cresson)

Microdus calcaratus CRESSON, Canad. Entom., vol. 5, 1873, p. 51.

Type.—In the Philadelphia Academy of Sciences.

A rather common species, which appears to be very constant in color markings. Face broader than long; clypeus broad and only slightly convex; third segment of labial palpi very short, usually indistinct; malar space short, rarely more than one-fourth the eye height; temples rather narrow, gradually receding; frontal impressions not deep, immargined; antennae 34 to 40 segmented; parapsidal furrows sharply impressed, sometimes weakly foveolate anteriorly; middle mesonotal lobe strongly elevated anteriorly; furrow in front of scutellum smooth, not distinctly pitted; pleura polished; mesopleural furrow short, rather weak, smooth; propodeum nearly always completely aerolated, the carinae prominent, the areas usually smooth within; second cubital cell triangular, usually shortly petiolate, the petiole nearly always distinctly shorter than the first abscissa of radius; first abscissa of mediella distinctly shorter than the second; nervellus not angled; abdomen polished; the first tergite with two prominent dorsal longitudinal keels; second and third tergites each with a more or less distinct transverse impressed line which is often weakly foveolate; suture between these two tergites also sometimes foveolate in part; ovipositor sheaths nearly as long as the body. Head black; thorax black, with propodeum and metapleura red; wings rather strongly infumated, the hind wing with the area behind the mediella more or less hyaline; anterior and middle legs black, their tarsi sometimes pale; posterior coxae and femora red; posterior trochanters, tibiae, and tarsi black; abdomen entirely red; length usually 4.5 to 6 mm.

The following material has been examined in the course of this study: The type, which is from Delaware; two specimens from Edgartown, Massachusetts, in the collection of the Boston Society

of Natural History; considerable material in the United States National Museum consisting of collected specimens from New York, New Hampshire, Virginia, Maryland, Massachusetts, and Texas; one specimen reared at Monticello, Florida, from *Psilocorsis*, new species, under Quaintance No. 10577; 11 specimens reared under Gipsy Moth Laboratory No. 12101, from *Acrobasis caryivorella* Ragonot, taken in Wakefield and Maynard, Massachusetts, and Manchester, Connecticut; and three specimens from Kenduskeag and Bangor, Maine, reared from *Acrobasis betulella* Hulst, under Gipsy Moth Laboratory No. 12406; and at the Gipsy Moth Laboratory, at Melrose Highlands, Massachusetts, a large series of specimens reared from *Acrobasis caryivorella* and *A. betulella* taken at various points in Massachusetts, New Hampshire, Maine, and Connecticut.

19. BASSUS USITATUS Gahan

Bassus usitatus GAHAN, Proc. U. S. Nat. Mus., vol. 55, 1919, p. 119.

Type.—In the United States National Museum.

Very similar to *calcaratus* and *difficilis*, the three species being exceedingly close; *usitatus*, judging by the two known specimens, appears to differ from the other two species in having the second cubital cell much more strongly petiolate, the petiole being distinctly longer than the first radial abscissa; it differs further from *calcaratus* in possessing red hind trochanters and in the more uniformly dusky hind wings, and from *difficilis* in the pale apical segment of all tarsi; the value of this last character, however, is doubtful, for in *calcaratus* the apical tarsal segment varies more or less in color, and this may prove to be true in *usitatus* and *difficilis*. Aside from the differences just noted, the characterization of *calcaratus* given above in the discussion of that species will apply to *usitatus*.

Known only from the two type specimens, which were reared from *Mineola vacinii* Riley at East Wareham, Massachusetts.

20. BASSUS DIFFICILIS, new species

Distinguishable from *usitatus* and *calcaratus*, its nearest allies, by the characters noted in the key and in the discussion of *usitatus*.

Female.—Length, 7.5 mm. Face rather flat, at least as broad as long, smooth; clypeus broad, nearly flat; malar space less than one-third the eye height; eyes large, broad; labial palpi short, the third segment minute, sometimes not distinct; temples not broad, receding gradually; frons polished, immargined; ocell-ocular line in the female about twice, in the male less than twice, the diameter of an ocellus; antennae of type 41 segmented; the first flagellar segment not longer than the scape; pronotal pits not margined by carinae; parapsidal furrows sharply impressed, smooth, or only weakly foveolate anteriorly; middle mesonotal lobe prominently elevated anteriorly; furrow in

front of scutellum smooth; propodeum regularly areolated, the carinae prominent, the areas usually smooth; mesopleural furrow shallow, smooth, and polished; radius arising from about the middle of the stigma; areolet triangular, subsessile or with a short petiole; nervulus very slightly postfurcal; first abscissa of mediella distinctly shorter than the second; inner spur of hind tibia a little longer than the outer and less than half the basitarsus; abdomen as long as the head and thorax combined; first tergite a little longer than broad at apex, with two prominent dorsal keels on the basal half; abdomen entirely polished, with only the transverse impressions on the second and third tergites, and the suture between these tergites, sometimes weakly foveolate; ovipositor sheaths distinctly a little shorter than the body. Head black; palpi blackish basally; thorax black, with the propodeum and metapleura usually red, rarely somewhat blackish; anterior and middle legs black; posterior coxae, trochanters, and femora red, their tibiae and tarsi black; wings deeply infumated; abdomen entirely red.

Male.—Length, 5 mm.; antennae of allotype 34-segmented; otherwise like the type; the anterior and middle tarsi of the male are sometimes pale.

Type.—Cat. No. 28686, U.S.N.M.

Type locality.—Palm Beach, Florida.

Described from five females and two males collected by Dr. H. G. Dyar at Palm Beach, Florida. In addition to the type series I have seen two specimens, collected by S. S. Crossman, at Inverness, Florida, which are at the Gipsy Moth Laboratory, Melrose Highlands, Massachusetts.

21. BASSUS TENUICEPS, new species

Differs from related species in combining the absence of parapsidal grooves with unusually narrow temples, a nonrostriform face, prominent dorsal longitudinal keels on the first tergite, and entirely yellowish legs.

Female.—Length, 6 mm. Head thin antero-posteriorly, the temples very narrow, strongly receding; face rather flat, smooth, a little broader than long; clypeus broad, only slightly convex; labrum short and broad; third segment of labial palpi minute; eyes moderately large; malar space about half the eye height; frons polished, immargined; ocelli large; ocell-ocular line about one and one-half times the diameter of an ocellus; head only slightly, broadly hollowed out behind; antennae 32-segmented in the type, slender; pronotal pits small, poorly defined; mesonotum polished; parapsidal furrows wanting; furrow in front of scutellum with several distinctly separated pits; propodeum more or less distinctly areolated, the carinae not very prominent, the areas rugulose; propodeal spiracle small, oval;

peural entirely polished; mesopleural furrow shallow, poorly defined, smooth; coxae smooth and polished; inner spur of hind tibia not distinctly longer than the outer, nearly half as long as the basitarsus; radius arising from the middle of the stigma; areolet triangular, strongly petiolate; first abscissa of mediella just about equal to the second; nervellus straight; discoidella wanting; first abdominal tergite a little longer than broad at apex, more or less striate medially and with two prominent dorsal longitudinal keels on the basal two-thirds; second and third tergites polished, the second with a nearly straight transverse impression which is foveolate; the suture between second and third tergites and the curved transverse furrow on the third also foveolate; ovipositor sheaths about as long as the body. Head, thorax, and abdomen of type uniformly testaceous; palpi pale yellow; antennae black; legs entirely testaceous, except the apex of hind tibiae and the hind tarsi, which are blackish; wings weakly infumated.

Male.—Essentially like the female; the anterior and middle trochanters and the extreme base of their femora a little blackish; the posterior tibiae mostly brownish black.

Type.—Cat. No. 28687, U.S.N.M.

Type locality.—Wild Horse Canyon, Animas Mountains, Arizona.

Allotype locality.—Globe, Arizona.

Described from one female and one male. The allotype was taken on *Thurberia thespesioides* by C. H. T. Townsend.

22. BASSUS NINANAE, new species

Most similar to *bicolor,* but at once distinguished by the long, not rounded, mostly smooth, dorsal face of propodeum; the thorax is a little more slender and the pleura more conspicuously pilose than in *bicolor;* furthermore, in the latter species the propodeum is rarely red, and then the thorax is practically entirely red; while in *ninanae,* the propodeum is usually reddish, though the pleura and pectus are black; the ovipositor sheaths are a little longer in *ninanae,* being as long as the thorax and abdomen combined.

Female.—Length, 6.2 mm. Face broader than long from antennal foramina to apex of clypeus, rather densely pilose, malar space fully as long as the second segment of antennal flagellum; temples not broad, gradually receding; frontal impressions immargined; ocell-ocular line not distinctly twice as long as the diameter of an ocellus; antennae very slender, 36-segmented in the type; mesoscutum rather long and narrow; the parapsidal furrows weakly indicated, polished; furrow in front of scutellum with several distinctly separated pits; propodeum mostly smooth, only slightly roughened down the middle, not areolated, and with a more or less distinct apical transverse carina setting off the short, abruptly descending,

posterior face from the long, rather flat, dorsal face; pleura polished, rather strongly pilose; mesopleural furrow weakly impressed, not foveolate; posterior coxae smooth, pubescent; posterior femora rather short and stout; spurs of hind tibiae apparently of equal length and shorter than half the hind basitarsus; last segment of hind tarsi not longer than the third; second cubital cell small, triangular, petiolated; radius arising from about middle of stigma; first abscissa of mediella about as long as the second or indistinctly shorter; nervellus straight; discoidella very weak, obsolete at base; abdomen slender; first tergite a little longer than broad at apex, with two prominent dorsal longitudinal keels extending from the base to the apical third, and usually with a few weak longitudinal striae between these keels; second and following tergites polished; ovipositor sheaths very nearly as long as the body. Ferruginous; head black, with clypeus, middle of face, cheeks, and temples often more or less reddish; mesonotum and propodeum ferruginous, sometimes more or less infuscated or blackish; propleura and metapleura usually ferruginous or fuscous, the mesopleura black; pro and meso pectus black; anterior and middle legs brownish black, the coxae and trochanters darkest; hind coxae and trochanters brownish black; their femora testaceous; posterior tibiae and tarsi brown; wings infumated; abdomen entirely ferruginous.

Male.—Essentially as in the female; but the thorax is darker, being entirely black except for ferruginous markings in the region of the parapsidal grooves.

Type.—Cat. No. 28688, U.S.N.M.

Type locality.—Huachuca, Arizona.

Host.—Carpocapsa ninana Riley.

Described from three female, and one male, specimens reared from the above host, June 20–27, 1883, under Bureau of Entomology No. 2711.

23. BASSUS ACROBASIDIS Cushman

Bassus acrobasidis CUSHMAN, Proc. U. S. Nat. Mus., vol. 58, 1920, p. 289.

Type.—In the United States National Museum.

Exceedingly similar to *erythrogaster*, and sometimes very difficult to distinguish from that species. However, the characters given in the key will nearly always separate them readily.

Face broader than long to the apex of clypeus; malar space usually a little longer than in *erythrogaster;* antennae distinctly longer, usually 32 to 36 segmented, rarely in very small specimens with 31 segments; the apical flagellar segments in the female slender, elongate; third segment of labial palpi short but distinctly longer than broad, not as in *calcaratus* and allied species; parapsidal furrows

very weak anteriorly, a little more pronounced posteriorly and uniting to form an elongate polished impression that is more pronounced than in *erythrogaster;* furrow in front of scutellum foveolate; propodeum rugulose, sometimes more or less distinctly areolated; mesopleural furrow shallow, smooth; areolet of anterior wing usually decidedly petiolate; first abscissa of mediella about as long as the second; first abdominal tergite more or less longitudinally striate or wrinkled and with two prominent dorsal keels; the transverse furrows on second and third tergites and the suture between the two usually more or less foveolate; ovipositor sheaths about two-thirds as long as the body. Head black, sometimes more or less reddish below; thorax black, with propodeum and metapleura and sometimes part of pro and meso pleura red; the propodeum rarely partly blackish; wings infumated; anterior and middle legs mostly black or blackish; posterior coxae, trochanters and femora red, the trochanters very rarely a little fuscous in small male specimens; posterior tibiae usually red, black at apex, but sometimes mostly dark reddish brown; hind tarsi black; abdomen red. Length, usually about 4 to 6 mm.

In addition to the type series the National Museum has a series of six specimens, which were reared from *Acrobasis*, species, at Brownsville, Texas, under Quaintance Nos. 16981, 16994, 16995 16996, 16997; and nine specimens recorded as parasitic on *Acrobasis caryivorella* Ragonot at College Station, Texas (S. W. Bilsing).

24. BASSUS ERYTHROGASTER Viereck

Bassus (*Aerophilopsis*) *erythrogaster* VIERECK, Proc. U. S. Nat. Mus., vol. 44 1913, p. 555.

Type.—In the United States National Museum.

Very close to *acrobasidis*, but certainly distinct, and separable by the differences pointed out in the above discussion of that species. In the specimens examined the antennae vary from 27 to 29 segmented, and in the female the apical segments are usually less slender than in *acrobasidis;* the parapsidal furrows are distinctly a little sharper anteriorly than posteriorly, and the posterior impression formed by their union is very shallow and not so well marked as in *acrobasidis;* the propodeum is usually more or less distinctly aerolated, the areas somewhat roughened; mesopleural furrow very shallow, polished; metapleura smooth; areolet of anterior wing triangular, usually with a very short petiole; the two abscissae of mediella about equal; abdomen as described for *acrobasidis*; ovipositor sheaths two-thirds to three-fourths as long as the body. Head and thorax black, with usually the metapleura in part, and rarely more or less of propodeum, red; only very rarely are metapleura and propodeum entirely red; wings infumated; legs as in *acrobasidis*, except that the hind tibiae are nearly always black; abdomen red.

The above observations are based on the following material: Five specimens constituting the type series; 37 additional specimens in the United States National Museum from Vienna, Virginia; Champaign, Illinois; Caney Spring, Tennessee (reared from lepidopterous larva in ragweed stem by G. G. Ainslie); Hagerstown, Maryland (from ragweed stem); Kansas; New York; Alabama; Georgia; Leesburg, Virginia; and Tallulah, Louisiana; and three specimens from Illinois, in the collection of the University of Illinois.

25. BASSUS BUTTRICKI Viereck

Bassus (*Lytopylus*) *buttricki* VIERECK, Bull. 22, Conn. Geol. and Nat. Hist. Survey, 1917 (1916), pp. 228 and 229.

Type.—In the agricultural experiment station at New Haven, Connecticut.

Most similar to *bicolor*, but nearly always readily distinguished by the characters given in the key; the antennae are distinctly shorter; the second abdominal tergite is very often closely striate on the basal half or more, this striate condition sometimes extending upon the third tergite as well; and the color variation of the thorax is not in the same direction as in *bicolor*. In a series of specimens of *bicolor* showing all gradations from an entirely black to an entirely red thorax the first reddish markings appear on the mesonotum and then gradually take in the pleura, leaving the pectus and the propodeum as the last parts to become red; in *buttricki*, on the other hand, the reddish coloring being at the propodeum and metapleura, and then extends to the mesopleura, mesopectus, and propleura, leaving the mesoscutum always black or blackish. Face distinctly broader than long; malar space about half the eye height; antennae varying in the material studied from 23 to 27 segmented; pronotal pits small; propleura polished, but with several distinct foveae just below the pronotal pits; mesopleural furrows very weak, smooth; mesoscutum only very weakly, sometimes indistinctly impressed medially behind the union of the parapsidal furrows; furrow in front of scutellum pitted; propodeum more or less areolated, but the areas usually poorly defined and rugulose within; mesopleural furrow shallow, polished; areolet of fore wing triangular, petiolate; the two abscissae of mediella of about equal length; first abdominal tergite more or less striate and with two prominent dorsal keels on the basal two-thirds; second tergite usually somewhat striate, occasionally completely so; third tergite often striate basally; ovipositor sheaths about as long as the body. Head black, the face in the palest specimens sometimes mostly ferruginous; thorax very rarely entirely black, the metapleura and propodeum at least being usually red; sometimes the entire thorax except the mesonotum is red; wings fuscous; anterior and middle legs black or brownish black; posterior

legs usually mostly black, but both their coxae and their femora vary from almost entirely red to completely black; abdomen red. Length, usually 3.5 to 5 mm.

In addition to the type, which is from Connecticut, I have seen two specimens in the collection of the Boston Society of Natural History, from Fort Kent, Maine and Mount Greylock, Massachusetts; and the following material in the National Museum collection: Fourteen specimens reared from larvae of *Isophrictis*, species in flowers of *Rudbeckia hirta*, at Liberty, Texas, by L. J. Bottimer; three from *Isophrictis*, species in flowers of *Rudbeckia maxima*, at Liberty, Texas; and collected specimens from Colorado; South Dakota; Georgia; Leesville, Louisiana; Glen Echo, Maryland; and Harpers Ferry, West Virginia.

26. BASSUS BICOLOR (Provancher)

Microdus bicolor PROVANCHER, Natural. Canad., vol. 12, 1880, p. 179.

Type.—In the Museum of Public Instruction at Quebec, Canada.

The close resemblance of this species to *buttricki* and the more important differences between the two are discussed above under *buttricki*.

Face distinctly broader than long to the apex of clypeus; malar space half, or more than half, as long as the eyes; third segment of labial palpi small, but slender and distinctly longer than broad; antennae of the specimens examined varying from 29 to 33 segmented; parapsidal furrows very weak, smooth; a slightly more distinct median impression posteriorly on mesoscutum than is found in *buttricki*; furrow in front of scutellum foveolate; mesopleural furrow shallow, smooth; propodeum usually rugulose and most frequently more or less distinctly areolated, although sometimes the areas are not at all distinctly defined; areolate of anterior wing triangular, small, strongly petiolate, the petiole usually longer than the first abscissa of radius; first and second abscissae of mediella about equal; first abdominal tergite more or less striate and with two prominent dorsal longitudinal keels extending to the apical third; tranverse impressions on the second and third tergites, and the suture between the two tergites usually crossed by numerous short striae; ovipositor sheaths about two-thirds as long as the body, distinctly shorter than in *buttricki*. Head black, very rarely, in exceptionally pale specimens, with the face mostly ferruginous; thorax usually mostly black, but varying to entirely ferruginous, the mesonotum being the first part to become pale and the propodeum the last, the propodeum being very rarely ferruginous; wings infumated; anterior and middle legs black or blackish; posterior legs black with the femora usually red or rufous; rarely, in very pale specimens, the hind coxae more or less ferruginous, abdomen ferruginous, the first tergite often black basally in the darker specimens.

The above notes are from the following material: Twenty specimens in the United States National Museum from Ottawa, Ontario; St. John, New Brunswick; Massachusetts; New Hampshire; Bar Harbor and Mount Desert, Maine; Long Island, New York; Harrisburg, Pennsylvania; Vienna, Virginia; and Washington, District of Columbia (reared from *Eucosma desertana* Zeller under Bureau of Etomology No. 3212); and eight specimens in the collection of the Boston Society of Natural History, which are from Gloucester, Provincetown, Cohasset, and Newton, Massachusetts; Mount Washington, New Hampshire; and Mount Desert, Eastport, and Bar Harbor, Maine.

27. BASSUS LATICEPS, new species

Very close to *terminatus*, but separated from that species without difficulty by means of the characters included in the key.

Female.—Length, 5 mm. Head transverse, broad, broader than the thorax, rather strongly hollowed out behind; face very much broader than long; eyes rather small, not reaching the vertex; temples and cheeks broad and bulging distinctly beyond the eyes; malar space about three-fourths the eye height; clypeus more or less elevated anteriorly; labrum large, rather long, rounded at apex; palpi slender; third segment of labial palpi not shortened, nearly as long as the fourth; frontal impressions immargined; ocelli small; ocell-ocular line more than three times the diameter of an ocellus; antennae slender, not tapering to the tip, 25-segmented in the type; scape rather long and slender; pedicel longer than broad; a broad, low, backwardly projecting triangular elevation between antennae; thorax rather stout; mesoscutum polished; parapsidal furrows sharply impressed, usually weakly foveolate; scutellum at least as broad as long, polished, indistinctly roughened at apex; propodeum weakly rugulose, with two more or less distinct, median carinae; posterior face of propodeum strongly declivous, the dorsal face rather short; propodeal spiracle very small, nearly round; pleura polished; mesopleural furrow straight, sharply impressed, usually finely foveolate; coxae polished; posterior coxae broad and a little shorter than the first tergite; posterior tibiae with a rather conspicuous backwardly projecting flange at apex bearing three or four short blunt spines; spurs of hind tibiae short, the inner spur only about one-third the basitarsus; posterior basitarsus distinctly less than half the hind tibiae; last segment of hind tarsus a little shorter than the second but longer than the third; areolet of fore wing triangular, usually shortly petiolate; first abscissa of mediella a little longer than the second; nervellus usually angled above the middle and emitting a distinct discoidella from this angle; first abdominal tergite about as broad at apex as long, polished, without two dorsal longitudinal keels; remainder of abdomen also

polished, the second tergite with only a faint suggestion of a transverse impression; ovipositor sheaths fully as long as the body. Color uniformly ferruginous, with antennae and palpi black, propodeum sometimes more or less black; anterior and middle trochanters, sometimes their femora basally, all tibiae at apex, and all tarsi, blackish; wings a little infumated.

Type.—Cat. No. 28690, U.S.N.M.

Type locality.—Arizona.

Described from eight female specimens labeled "Ariz. 2122, Collection C. F. Baker." The National Museum also has one male specimen, not included in the type series, which is from Takoma, District of Columbia.

28. BASSUS TERMINATUS (Cresson)

Microdus terminatus CRESSON, Proc. Ent. Soc. Phila., vol. 4, 1865, p. 298.
Orgilus terminalis ASHMEAD, Proc. U. S. Nat. Mus., vol.11, 1889 (1888), p. 640.

Type.—The type of *terminatus* in the collection of the Philadelphia Academy of Science; that of *terminalis* is in the United States National Museum.

There seems to be no basis on which to separate *terminalis* from *terminatus*, and I believe they are the same species. The characters given in the key will readily distinguish this species from *laticeps*, which is apparently its nearest relative.

Face broader than long; temples not bulging so strongly as in *laticeps* and not nearly as broad as in that species; eyes a little larger and extending to the vertex; malar space about two-thirds as long as the eyes; clypeus not elevated anteriorly; labrum a little shorter than in *laticeps;* third segment of labial palpi shortened but longer than broad; antennae slender, usually 29 to 31 segmented; the first flagellar segment four times as long as broad and longer than the scape and pedicel combined; parapsidal furrows sharply impressed and finely foveolate; furrow in front of scutellum with several pits; propodeum closely rugulose; hind femora rather stout; mesopleural furrow straight, foveolate; inner spur of hind tibia longer than the outer but less than half the basitarsus; posterior basitarsus distinctly longer than half the hind tibia; apical segment of hind tarsi about as long as the third; posterior tibiae short, thickened at apex, with a group of 10 or more short stout spines above the outer terminal spur; areolet of fore wing triangular, petiolate; first abscissa of mediella distinctly longer than the second; nervellus angled above the middle and emitting a distinct discoidella from this angle; first abdominal tergite broad, closely finely striate, but without prominent dorsal keels; second and following tergites polished; ovipositor sheaths distinctly shorter than the body. Ferruginous; antennae black;

propodeum and pectus usually, and in the male sex the apical abdominal tergites, blackish; wings somewhat infumated; legs ferruginous, with the anterior and middle coxae, all trochanters, apex, and an annulus near base of hind tibiae and the hind tarsi black or blackish.

In addition to the types, both of which are from Colorado, I have seen only four specimens, which are in the National Museum. These specimens are from Colorado and Oklahoma.

29. BASSUS GIBBOSUS Say

Bassus gibbosus SAY, Boston Journ. Nat. Hist., vol. 1, 1836, p. 250.
Microdus pygmaeus CRESSON, Trans. Amer. Ent. Soc., vol. 4, 1872, p. 182.
Agathis scrutator PROVANCHER, Addit. faun. Canad. Hymen., 1886, p. 137.
Agathis dispar PROVANCHER, Addit. faun. Canad. Hymen., 1886, pp. 137 and 138.
Microdus meridionalis VIERECK, Trans. Amer. Soc., vol. 29, 1903, pp. 95 and 96.
Microdus wichitaensis VIERECK, Trans. Kans. Acad. Sci., vol. 19, 1905, p. 276.
Microdus castaneicinctus VIERECK, Trans. Kans. Acad. Sci., vol. 19, 1905, p. 276.

Type.—Say's type is probably lost; Cressons's type of *pygmaeus* is in the United States National Museum;[15] that of Viereck's *meridionalis* is in the Philadelphia Academy of Science; those of *scrutator* and *dispar* are in the Museum of Public Instruction at Quebec, Canada; and those of *wichitaensis* and *castaneicinctus* are in the collection of the University of Kansas.

Although Say's type of *gibbosus* is not available there seems to be no reasonable doubt that the species here treated as *gibbosus* is what Say had before him. The types of *pygmaeus meridionalis, wichitaensis,* and *castaneicinctus,* all of which I have studied, certainly belong to the same species, and in my opinion are *gibbosus.* I have not seen the types of *scrutator,* and *dispar,* but the original descriptions, combined with notes on the types by S. A. Rohwer, seem to leave no doubt that they also are *gibbosus.*

The species is most similar to *tibiator,* but usually is not difficult to distinguish from that species. The face is nearly always distinctly shorter; the third segment of the labial palpi is relatively much smaller; the basal tooth of the tarsal claws is more strongly developed; the areolet is rarely broadly sessile; and the abdomen is nearly always much more strongly sculptured than in *tibiator,* and is often ferruginous on the second or third tergites or more.

Face distinctly transversely convex; clypeus convex; head strongly hollowed out behind; antennae slender, not tapering to the tip, and usually 22 to 28 segmented; the third segment of labial palpi very short and slender; parapsidal furrows sharply impressed, usually finely foveolate or punctate; propodeum usually more or less finely

[15] Cresson, Mem. 1, Amer. Ent. Soc., 1916, p. 71, assigns type number 2747 to this species and records the type as being in the collections of the Philadelphia Academy of Sciences. The specimen in the Philadelphia Collection is, as Cresson indicates, a male and is the allotype. The holotype female is in the National Museum and has been given type number 1638. The head of the holotype is wanting.—S. A. ROHWER.

rugulose, sometimes mostly smooth, always with two median longitudinal carinae that diverge very slightly behind; mesopleural furrow minutely foveolate; first abdominal tergite broad, closely rugulosostriate; second tergite usually mostly rugulose and with a curved transverse impression near the middle; third tergite sometimes partly sculptured; ovipositor sheaths about two-thirds as long as the body. Head and thorax black; wings slightly dusky to hyaline; all coxae and trochanters usually blackish, the remainder of the legs mostly brownish yellow; rarely, the coxae and trochanters more or less ferruginous; abdomen varying from entirely black to nearly entirely ferruginous. Length usually 2 to 4 mm.

The above discussion is based on a study of the types of *pygmaeus*, *meridionalis*, *wichitaensis*, and *castaneicinctus;* and a large amount of material in the National Museum, which includes collected specimens from Maryland, Texas, Colorado, Michigan, California, Virginia; New Mexico, Georgia, Kansas, Illinois, New York, Massachusetts, and Canada, and the following reared material: Eight specimens from *Phthorimaea glochinella* Zeller, at Baton Rouge, Louisiana (T. H. Jones); 7 reared from the same host, at the same locality, by J. L. E. Lauderdale under Chittenden No. 4268; 5 from *Phthorimaea operculella* Zeller, at Los Angeles, California (J. E. Graf); 2 from *Mompha stellella* at Riverton, New Jersey (H. B. Weiss); 10 from the same host at Washington, D. C. (A. Busck); 3 specimens reared from *Mompha*, species at Vienna, Virginia, under Quaintance No. 7187; and 1 labeled as reared from "*Gortyna nitela*" in Missouri.

30. BASSUS BREVICORNIS, new species

Very similar to *tibiator*, but distinguishable at once by the shorter antennae and the longer ovipositor. Although the smallest specimens of *brevicornis* are as large as the largest *tibiator*, the number of segments in the antennae is always smaller. The first tergite is usually more coarsely striate than in *tibiator*, the labrum is more strongly hairy, the wings somewhat more deeply infuscated, and the mesopleural furrow usually more coarsely foveolate; the last segment of the posterior tarsi scarcely as long as the third, while in *tibiator* it is usually longer.

Female—Length, 5.5 mm. Face very long; malar space usually longer than the eyes; face strongly convex down the middle line; clypeus very long; labrum rather large, closely hairy; palpi slender; third segment of labial palpi not shortened, nearly as long as the fourth; frons immargined; head strongly hollowed out behind; ocell-ocular line about one and one-half times as long as the diameter of an ocellus and not longer than the postocellar line; antennae short, 22-segmented in the type; scape not large; pedicel slightly longer than broad; flagellum slender, not tapering at all to

the apex; first flegellar segment decidedly longer than scape and pedicel combined and much longer than the second flagellar segment; the apical segments of flagellum short; thorax long and narrow; parapsidal grooves sharply impressed, finely foveolate; mesonotal lobes usually a little more elevated and polished than in *tibiator;* furrow in front of scutellum very broad in the middle, more or less pitted; scutellum longer than broad at base, slightly convex; propodeum mostly smooth, finely rugulose down the middle and along the sides, and with two complete median longitudinal carinae that meet at the base of propodeum and diverge gradually but very slightly to the apex; propodeal spiracles very small, nearly circular; pleura polished; mesopleural furrow usually broader and more coarsely foveolate than in *tibiator;* spurs of hind tibiae nearly equal in length, distinctly less than half the basitarsus; tarsal claws without a basal tooth; second cubital cell four-sided, the second abscissa of radius short but distinct; first abscissa of mediella a little longer than the second; nervellus angled and emitting a distinct discoidella from this angle; first abdominal tergite scarcely longer than broad at apex, closely, rather strongly striate, and without two dorsal longitudinal keels; remainder of abdomen polished, although the second tergite sometimes has some weak striae originating in the shallow transverse impression; ovipositor sheaths as long as the body. Head, thorax, and abdomen entirely black; wings strongly infumated; legs black, with anterior and middle femora at apex, and their tibiae mostly, brownish yellow; posterior tibiae broadly black at apex and with a black annulus near base, brownish at extreme base and on the middle; all tarsi black or blackish.

Male.—Agrees with the description of the female except for sexual characters. The antennae of the allotype are 23-segmented.

Type.—Cat. No. 28691, U.S.N.M.

Type locality.—Alameda Foothills, California.

Allotype locality.—Hayward, California.

Described from two female specimens collected at the type locality by W. M. Giffard, and one male collected by M. C. Lane. The female paratype has 23-segmented antennae.

31. BASSUS TIBIATOR (Provancher)

Agathis tibiator PROVANCHER, Natural. Canad., vol. 12, 1880, p. 177.
Agathis parvus VIERECK, Trans. Amer. Ent. Soc., vol. 29, 1903, p. 96.
Bracon (Agathis) solidaginis VIERECK, Bull. 22, Conn. Geol. and Nat. Hist. Survey, 1917 (1916), pp. 230 and 231.

Type.—The type of *tibiator* is in the Museum of Public Instruction at Quebec, Canada; that of *parvus* is in the Philadelphia Academy of Science; and that of *solidaginis* is in the agricultural experiment station at New Haven.

This species is very similar to *gibbosus* and *brevicornis*, but can be distinguished from both as pointed out in the above discussions of those species. Face elongate, narrow; malar space usually nearly as long as the eyes; palpi slender, as in *brevicornis*; antennae slender, usually 25 to 27 segmented; parapsidal furrows impressed, narrow, usually minutely foveolate; mesonotal lobes usually with scattered shallow punctures; propodeum about as in *brevicornis*; mesopleural furrow very narrow, minutely foveolate or punctate; second cubital cell usually distinctly four-sided, though very narrow above, on the radius; first abscissa of mediella longer than the second; abdomen mostly polished, the first tergite usually only faintly striate, the second sometimes very weakly sculptured in part; ovipositor sheaths about two-thirds as long as the body. Head, thorax, and abdomen black, very rarely the second tergite a little tinged with reddish; wings a little dusky, not deeply infumated; legs usually as described for *brevicornis*.

In addition to the types of *parvus* and *solidaginis*, I have seen considerable material in the United States National Museum, all collected specimens, from a wide range of localities, including St. John and Nerepis, New Brunswick; Hagerstown, Maryland; White River, South Dakota; Riley County, Kansas; West Point, Nebraska; Colorado; Arlington, Virginia; Easton, Washington; and Los Angeles, California; this collection also includes a homotype, determined by S. A. Rohwer, which is without locality data.

32. BASSUS ANNULIPES (Cresson)

Microdus annulipes Cresson, Canad. Ent., vol. 5, 1873, p. 53.
Microdus earinoides Cresson, Canad. Ent., vol. 5, 1873, p. 54.
Microdus grapholithae Ashmead, Proc. U. S. Nat. Mus., vol. 11, 1889 (1888), p. 639.
Microdus albocinctus Ashmead, Proc. U. S. Nat. Mus., vol. 11, 1889 (1888), p. 639.
Bassus waldeni Viereck, Bull. 22 Conn. Geol. and Nat. Hist. Survey, 1917 (1916), pp. 228 and 229.

Type.—The types of *annulipes* and *earinoides* are in the Philadelphia Academy of Science; those of *grapholithae* and *albocinctus* are in the United States National Museum; and that of *waldeni* is in the agriculture experiment station at New Haven, Connecticut.

A study of all of these types has convinced me that they represent but a single species. The unusually wide variations are doubtless responsible for the description of the species under so many names. The type of *earinoides*, which has the body practically entirely black, represents one extreme, while that of *grapholithae*, which is almost wholly testaceous, represents the other, and the types of *annulipes*, *albocinctus*, and *waldeni* fall between these extremes. The National Museum material of this species is rather extensive and contains a good series of intergrades.

The face is unusually short and broad; eyes short oval, broad; malar space short; third segment of labial palpi very small, transverse, sometimes indistinct; temples with a conspicuous bulge, or broad rounded tubercle opposite the middle of the eyes; ocell-ocular line less than twice the diameter of an ocellus and not greater than the postocellar line; antennae long and slender, from 32 to 40 segmented; thorax rather long and narrow; parapsidal furrows sharply impressed and foveolate; the middle mesonotal lobe narrow and somewhat elevated; scutellum small, more or less distinctly carinately margined at the apex; propodeum rugoso-reticulate, with two usually prominent, slightly curved median carinae down the middle that converge toward the base and also toward the apex, inclosing a long median area that extends the length of the propodeum; mesopleural furrow narrow, usually finely foveolate; areolet of fore wing triangular, oblique, petiolate; radial cell very narrow; posterior basitarsus long and slender, usually longer than the remaining segments of hind tarsi combined; abdomen slender; first tergite distinctly longer than broad at apex, usually weakly longitudinally sculptured, but sometimes almost polished; second tergite with a more or less distinct curved transverse furrow near its middle, usually completely polished like the third and following tergites; ovipositor sheaths about as long as the body or nearly. Head, thorax, and abdomen varying from entirely black to practically entirely testaceous; usually, however, the head is black with more or less of the face and cheeks ferruginous, the thorax mostly black and the abdomen black at base and apex; wings hyaline; legs, including all coxae, pale testaceous, except the hind tibiae which are whitish, with the apex and a narrow incomplete annulus at base black, and the hind tarsi which are black, with the base of the basal segment white.

These notes are based on a considerable number of specimens, as follows: The types of all the species listed in the above synonymy; 28 specimens, all from Illinois, in the collection of the University of Illinois; 2 in the collection of the Boston Society of Natural History, from Ashland Junction, Maine, and Weston, Massachusetts; and 44 specimens in the United States National Museum, including 6 which were reared from *Pithinolophus indentata* Dyar at East River, Connecticut, by C. R. Ely; 1 recorded as a parasite of *Ancylis comptana* Frölich, in Virginia, under Bureau of Entomology No. 3552X; 1 labeled "Parasite on *?Coelostathma discopunctana*, Washington, District of Columbia, Chittenden No. 6815"; and collected specimens from Virginia, New Jersey, Illinois, Florida, Alabama, New York, Pennsylvania, Ohio, Michigan, Kansas, Iowa, New Hampshire, and Canada.

33. BASSUS CARPOCAPSAE Cushman

Bassus carpocapsae CUSHMAN, Proc. U. S. Nat. Mus., vol. 48, 1915, p. 508. Female.

Bassus carpocapsae CUSHMAN, Proc. Ent. Soc.Wash., vol. 17, 1915, p.142. Male.

Type.—In the United States National Museum.

Most similar to *laticinctus*, but distinguished especially by the differences noted in the key. Face short and very broad; labial palpi short, the third segment minute; malar space not distinctly half the eye height; temples very narrow, strongly receding; ocell-ocular line about twice the diameter of an ocellus: frontal impressions very small and shallow; antennae usually 32 to 38 segmented, very slender; scape rather slender; first flagellar segment not distinctly as long as the scape and pedicel combined; head scarcely hollowed out behind; parapsidal furrows strong, foveolate; propodeum rather short, convex, strongly declivous behind, entirely coarsely rugose; mesopleural furrow usually distinctly foveolate; areolate of fore wing triangular, petiolate; medius obsolescent basally; first abscissa of mediella fully as long as the second; abdomen stout; first tergite short and broad at apex, longitudinally striate; second and following tergites polished; ovipositor sheaths about two-thirds as long as the body. Head black, with narrow ferruginous superior orbital lines, and sometimes with face and cheeks mostly ferruginous; thorax black; legs testaceous, the posterior coxae often more or less black; posterior tibiae dusky at extreme tips, less broadly so than in *laticinctus*; posterior tarsi more or less dusky; wings slightly dusky; abdomen varying from black, with second and most of third tergites testaceous, to entirely testaceous with only slight duskiness on the first tergite.

In addition to the type series, which contains specimens from Massachusetts, Delaware, Virginia, Maryland, and Pennsylvania, most of which were reared from *Carpocapsa pomonella* Linnaeus, the National Museum has five specimens recorded as a parasite of the same host of Dover, Delaware, under Quaintance No. 9287 (E. R. Selkrigg).

34. BASSUS LATICINCTUS (Cresson)

Microdus laticinctus CRESSON, Canad. Ent., vol. 5, 1873, p. 53.

Microdus ocellanae RICHARDSON, Canad. Ent., vol. 45, 1913, p. 211.

Microdus carinoides DU PORTE (not Cresson), Rep. Quebec Soc. Protection Plants, vol. 7, 1915, p. 76.

Type.—The type of *laticinctus* is in the Philadelphia Academy of Science; that of *ocellanae* is in the Canadian National collection at Ottawa.

Closely related to *carpocapsae*, but undoubtedly distinct and separable by the differences noted in the key and in the above characterization of *carpocapsae*. It also somewhat resembles *annulipes*, and has sometimes been identified as *carinoides* Cresson, which is a syn-

onym of *annulipes*, but it is readily separated from that species by the narrower, strongly receding temples, the usually more or less blackish hind coxae, the noncarinate scutellum, and the usually partly striate second tergite.

Face broader than long to the apex of clypeus but not so short as in *annulipes*, shining, finely punctate; temples strongly receding, without a bulge or tubercle; antennae slender, usually 33 to 38 segmented; third segment of labial palpi minute, sometimes indistinct; head, viewed from above, scarcely hollowed out behind; parapsidal furrows impressed, foveolate; middle lobe of mesoscutum not prominently elevated; propodeum rugose, not areolated, strongly declivous posteriorly; mesopleural furrow finely foveolate; metapleura shining, evenly punctate; inner spur of posterie tibia or about half as long as the basitarsus; areolet of fore wing triangular, petiolate, usually not so oblique as in *annulipes;* medius very weak basally; first abscissa of mediella about as long as the second; abdomen much more slender than in *carpocapsae;* first tergite longer than broad at apex, longitudinally striate, the striae usually straight and rather strong; second tergite about as long as broad, and usually delicately longitudinally striate on the basal two-thirds, rest of abdomen polished; ovipositor sheaths at least two-thirds as long as the body. Head and thorax entirely black; antennae black; palpi yellow; wings very weakly dusky, sometimes practically hyaline; anterior and middle legs entirely testaceous; hind legs testaceous, with their coxae usually more or less blackish basally, and their tibiae usually rather broadly blackish apically; the hind tarsi are usually mostly yellowish; first abdominal tergite entirely black; the second nearly always more or less yellowish; the third and following black.

The above notes are based on the type of *laticinctus* and on the following material in the National Museum: Five specimens reared from *Tmetocera ocellana* Schiffermüller at St. Annes, Quebec; one reared from the same host, in Clarke County, Washington, by E. J. Newcomer, under Quaintance No. 11440; another recorded as a parasite of the same host at Wallingford, Connecticut, by B. A. Porter, under Quaintance No. 16628; one from Vineland, New Jersey, also reared from the bud moth; and five specimens without locality data.

35. BASSUS IMMACULATUS Gahan

Bassus immaculatus GAHAN, Proc. U. S. Nat. Mus., vol. 55, 1919, p. 118.

Type.—In the United States National Museum.

Distinguished from all related species by the uniform, delicately granular, sculpturing of the propodeum. The four specimens of the type series have the head, thorax, and abdomen uniformly testaceous; but additional material may show some variation in this respect; the legs are entirely testaceous with only the apex of hind

tibiae, a narrow annulus near their base, and the tarsi more or less blackish; and the wings are very faintly dusky. Head scarcely hollowed out behind; face broader than long; third segment of labial palpi very short, hardly apparent; parapsidal furrows sharply impressed, not distinctly foveolate; middle mesonotal lobe prominent; first abdominal tergite delicately granular like the propodeum, without carinae; remainder of abdomen polished, the second tergite sometimes with very faint suggestion of fine reticulation; ovipositor sheaths a little shorter than the body.

Host.—*?Phthorimaea striatella* Murtfeldt.

Known only from the four specimens comprising the type series. These are from Baton Rouge, Louisiana.

36. BASSUS RUBRIPES (Cresson)

Agathis rubripes CRESSON, Trans. Amer. Ent. Soc., vol. 4, 1872, p. 183.

Type.—In the Philadelphia Academy of Science.

This species differs from all related forms in combining a subrostriform face with closely granular basal abdominal tergites, hind coxae, and pro and meso pleura. Face as long as broad; clypeus long, strongly convex; labial palpi slender, the third segment not shortened, nearly as long as the second; malar space two-thirds to three-fourths as long as the eyes; head strongly excavated behind; the temples above bulging strongly posteriorly; antennae usually 26 to 29 segmented; parapsidal furrows impressed, minutely foveolate or punctate; scutellum flat, polished, longer than broad at base; propodeum rather long, only very slightly declivous posteriorly, mostly closely granular, rugulose laterally, and with two median longitudinal carinae that are very close and diverge only slightly posteriorly; propleura, the mesopleura posteriorly, and the metapleura completely, granular and opaque, the granulation being coarsest on the metapleura and very fine on the mesopleura; posterior coxae closely granular and opaque; areolet of fore wing triangular, sessile; first abscissa of mediella longer than the second; nervellus somewhat angled and emitting a distinct discoidella; first abdominal tergite short and broad, conspicuously impressed basally, and with two more or less distinct longitudinal keels bordering the basal impression; the surface of this tergite finely granular and opaque; second tergite much broader than long, evenly granular, but usually more finely so than the first; third and following tergites polished; ovipositor sheaths as long as the abdomen and propodeum combined. Head and thorax entirely black; all coxae black; basal segment of all trochanters more or less blackish; remainder of legs testaceous, except the tarsi which are more or less dusky or blackish; wings somewhat infumated; abdomen black with the second segment, and sometime the sides of the apical segments, more or less rufous.

The following material served as the basis for the above discussion: The type which is from Texas; 24 specimens in the National Museum from Florida, Louisiana, Georgia, Wyoming, Ohio, Pennsylvania, Virginia, Maryland, District of Columbia, New York, Massachusetts, and Canada; 1 specimen from Illinois in the collection of the University of Illinois; and 3 specimens from Edgartown, Massachusetts, in the collection of the Boston Society of Natural History.

37. BASSUS NIGRICOXUS (Provancher)

Microdus nigricoxus PROVANCHER, Addit. faun. Canad. Hymen., 1886, pp. 137 and 138.

Type.—In the Museum of Public Instruction at Quebec Canada.

A small species with an entirely black body and black hind femora. Face short, impunctate, polished; labial palpi short, the third segment very small; antennae usually 32 to 36 segmented, slender; parapsidal furrows sharply impressed, usually finely foveolate; middle mesonotal lobe rather strongly convex; furrow in front of scutellum pitted; scutellum small, convex; propodeum coarsely irregularly rugose; mesopleural furrow finely foveolate; metapleura closely granular and opaque; posterior coxae large, a little longer than the first abdominal segment; areolet of fore wing very small, triangular, petiolate; medius very faint, almost obsolete; first abscissa of mediella slightly shorter than the second; abdomen slender; first tergite much longer than broad at apex, entirely closely granular and opaque; second tergite a little broader than long and closely granular and opaque like the first; third tergite granular basally, polished apically like the remaining segments; ovipositor sheaths about as long as the abdomen or very slightly longer. Head, thorax, and abdomen black; tegulae black; all coxae, basal segment of trochanters, and the posterior femora black; anterior and middle legs brownish yellow beyond the trochanters; posterior tibiae blackish, with the extreme base and a more or less distinct annulus on the middle brown; wings subhyaline.

I have seen only seven specimens of this species, all of which are in the United States National Museum; one of these is labeled "Cana. 2068, Collection C. F. Baker"; one is from Nerepis, New Brunswick (A. G. Leavitt); one from Jamesburg, New Jersey; one from Pennsylvania; and three from Oswego, New York.

38. BASSUS COLEOPHORAE Rohwer

Bassus coleophorae ROHWER, Proc. U. S. Nat. Mus., vol. 49, 1915, p. 230.
Bassus pyrifolii VIERECK, Bull. 22, Conn. Geol. and Nat. Hist. Survey, 1917 (1916) pp. 226 and 229.

Type.—The type of *coleophorae* is in the United States National Museum; that of *pyrifolii* is in the collection of the agricultural experiment station at New Haven, Connecticut.

Closely resembles *nigricoxus*, but can be distinguished by the smoother abdomen, hind coxae, and metapleura, by the pale tegulae and trochanters and by the second tergite being sometimes more or less reddish. It apparently is even more similar to *cinctus*, the only conspicuous difference being the darker hind femora of *coleophorae;* it is possible that this species is merely an unusually dark form of *cinctus*. The type of *pyrifolii* is almost an exact duplicate of that of *coleophorae*.

Face short, impunctate, shining; malar space less than half the length of the eyes; antennae of the types of both *pyrifolii* and *coleophorae* 31-segmented; ocellocular line less than twice the diameter of an ocellus; parapsidal furrows impressed, finely foveolate; mesonotal lobes weakly punctate; scutellum polished; propodeum rugulose; mesopleural furrow weakly foveolate; posterior coxae smooth, faintly granular above; metapleura very weakly sculptured, shining; areolet of anterior wing small, triangular, petiolate; abdomen slender; first tergite longer than broad at apex, very finely granular; second and following tergites smooth and shining; ovipositor sheaths a little longer than the abdomen. Head and thorax black; tegulae yellow; all coxae black; fore and middle legs below the coxae yellowish; hind trochanters pale; hind femora black; posterior tibiae white, with an annulus near base and the apical third or more black; middle and hind tarsi more or less blackish; wings hyaline; abdomen black, with the second tergite sometimes slightly reddish.

Known only from the type and paratype of *coleophorae* and the type of *pyrifolii;* the former were recorded as reared from *Coleophora leucochrysella* Clemens at Charter Oak, Pennsylvania; the latter is from New Haven, Connecticut.

39. BASSUS CALIFORNICUS, new species

Most similar to *cinctus*, but differs in having all the coxae entirely black, the trochanters more or less blackish, the temples distinctly broader and less receding, the malar space longer, and the ovipositor sheaths usually longer.

Female.—Length, 5.4 mm. Face slightly broader than long to the apex of clypeus, completely polished; malar space more than half as long as the eyes; clypeus more than twice as broad as long, somewhat convex; labrum transverse, broadly truncate at apex; third segment of labial palpi very small but distinct; temples rounded, not strongly receding; frons immargined; postocellar line twice, ocellocular line more than twice the diameter of an ocellus; antennae slender, 33-segmented in the type, the six or eight apical segments very short, hardly longer than broad; a rather sharp ridge between antennae; parapsidal furrows sharply impressed and foveolate; mesonotal lobes smooth and shining; furrow in front of scutellum pitted;

scutellum convex, polished; propodeum strongly rounded anteriorly, rugose, not areolated; propleura rugulose anteriorly, mesopleural furrow sharply impressed, foveolate; metapleura mostly smooth; posterior coxae smooth and shining; inner spur of hind tibia less than half the basitarsus; areolet of anterior wing very small, triangular, strongly petiolate; first abscissa of mediella a little shorter than the second; first abdominal tergite a little longer than broad, very minutely, weakly coriaceous except apically, where it is polished, entirely strongly shining; remainder of abdomen polished; ovipositor sheaths about three-fourths as long as the body. Head and thorax entirely black; all coxae and more or less of the trochanters black; all femora ferruginous, the posterior pair a little blackish at tips; anterior and middle tibiae concolorous with their femora, the middle pair, however, with a blackish annulus near base and the apex more or less dusky; hind tibiae yellowish, paler than their femora, with an incomplete black annulus near base and the apical fourth black; all tarsi more or less blackish; wings very slightly dusky; abdomen black, with the second tergite and sometimes the basal half of the third more or less reddish.

Male.—Essentially as in the female.

Type.—Cat. No. 28692, U.S.N.M.

Type locality.—Los Angeles, California.

Described from two females and one male, all from the above locality without further data.

40. BASSUS CINCTUS (Cresson)

Microdus cinctus CRESSON Canad. Entom., vol. 5, 1873, p. 53.
Microdus pimploides VIERECK, Trans. Kans. Acad. Sci., vol. 19, 1905, p. 276.
Bassus winkleyi VIERECK, Bull. 22, Conn. Geol. and Nat. Hist. Survey, 1917 (1916), pp. 227 and 229.

Type.—The type of *cinctus* is in the Philadelphia Academy of Sciences; that of *pimploides* is at the University of Kansas; and that of *winkleyi* is in the collection of the agriculture experiment station at New Haven, Connecticut.

After studying these three types I am of the opinion that they belong to the same species; *pimploides* and *winkleyi* therefore are suppressed as synonyms of *cinctus*, which has priority. A small rather slender species, varying in length from 3 to 4.5 mm.; face distinctly broader than long, polished, malar space less, usually much less, than half the length of the eyes; third segment of labial palpi very small, sometimes indistinct; temples sloping gradually from the eyes, but not especially narrow; antennae slender, 30 to 37 segmented in the material examined; ocell-ocular line not distinctly quite twice the greatest diameter of an ocellus; parapsidal furrows sharply impressed, usually minutely foveolate; furrow in front of

scutellum foveolate; scutellum rather small, polished; propodeum evenly rounded antero-posteriorly, rugoso-reticulate, not areolated; propleura mostly polished, a little roughened anteriorly; mesopleura more or less punctate or granular; posterior coxae minutely granular, shining; inner spur of hind tibia very nearly half as long as the basitarsus; areolet of fore wing small, triangular, usually petiolate; medius very weak, sometimes almost wanting; abdomen slender; first tergite longer than broad at apex; very finely uniformly granular and opaque or subopaque; second tergite sometimes polished but often delicately coriaceous; remainder of dorsum of abdomen highly polished; ovipositor sheaths a little longer than the abdomen. Head and thorax entirely black; anterior and middle legs, including coxae, entirely yellowish ferruginous; posterior coxae varying from entirely ferruginous to mostly black; hind trochanters and femora ferruginous, the latter blackish apically; hind tibiae yellowish white, with an incomplete black annulus near base and the apical third black; their tarsi black; wings hyaline; first abdominal tergite always completely black, the second usually yellowish on at least the basal half; third and following segments entirely black.

The above characterization was drawn from the following material: The types of *cinctus*, *pimploides*, and *winkleyi*, 18 specimens in the United States National Museum from the various localities in Indiana, Illinois, Michigan, Minnesota, Virginia, Florida, Pennsylvania, New Jersey, Massachusetts, New York, and Canada; 1 specimen from Bar Harbor, Maine (C. W. Johnson), in the collection of the Boston Society of Natural History; and 1 from Illinois in the University of Illinois. One of the National Museum specimens is recorded as a parasite of *Eulia velutinana* Walker at Winchester, Virginia.

41. BASSUS AGILIS (Cresson)

Microdus agilis Cresson, Canad., Ent., vol. 5, 1873, p. 52.
Agathis quaesitor Provancher, Natural. Canad., vol. 12, 1880, p. 176.

Type.—The type of *agilis* is in the Philadelphia Academy of Sciences; that of *quaesitor* is in the Museum of Public Instruction at Quebec.

The original description of *quaesitor* and notes on Provancher's type by S. A. Rohwer describe *agilis* so exactly that I have no hesitation in considering the two names synonymous, although I have not seen the type of *quaesitor*. This species is relatively very constant in color and sculpture, and is usually very easily distinguished. Face about as long as broad, but not rostriform; malar space inclining strongly inwardly, and at least half as long as the eyes; clypeus somewhat convex, more than twice as broad as long, and broadly emarginate at apex; third segment of labial palpi short but distinct, somewhat less than half as long as the second segment; a sharp

prominence between antennae extending nearly to the median ocellus; antennae long and slender, usually 36 to 41 segmented; temples gradually receding; head only slightly hollowed out behind, as seen from above; mesoscutum elongate; parapsidal furrows sharply impressed and meeting only a short distance before the posterior margin of scutum, more or less foveolate; furrow in front of scutellum distinctly pitted; scutellum convex, polished; propodeum completely strongly rugose, without carinae, its dorsal face long, not distinctly rounded antero-posteriorly; propleura smooth except anteriorly where it is finely rugulose; mesopleura furrow impressed, foveolate; metapleura finely granular, rugose below; posterior coxae very delicately granular and subopaque; second cubital cell triangular, very small, narrow, subsessile, or with a short petiole; medius very weakly developed; first abscissa of mediella very slightly shorter than the second; first abdominal tergite longer than broad at apex, finely evenly granular, sometimes also a little wrinkled basally; second tergite broader than long, finely evenly granular; the third sometimes weakly granular toward base; remainder polished; ovipositor sheaths about as long as the thorax and abdomen combined. Head black, with the labrum and more or less of clypeus red; antennae usually black; thorax entirely black, very rarely with a small reddish spot on metapleura; legs, including all coxae entirely, bright reddish yellow, with the extreme apex of hind femora and the middle and posterior tarsi blackish; hind tibiae yellowish, with an annulus near base, and the apex broadly, black; wings hyaline or subhyaline; first, second, and often more or less of third tergites reddish testaceous, the first tergite rarely a little infuscated basally; most of third and following tergites usually entirely black, but very rarely mostly reddish. Length, usually 4 to 6.5 mm.

This is a very common species and a large amount of material has been studied in the course of the preparation of the above notes. This includes the type of *agilis*, which is from Massachusetts; many specimens in the National Museum, including several series reared in the Bureau of Entomology, from *Pyrausta nubilalis* Huebner, the European Corn Borer, collected at Lynn, Saugus, Melrose, Wakefield, and Watertown, Massachusetts, under Webster No. 16490; four specimens reared from *Archips rileyana* Grote, at Victoria, Missouri, under Bureau of Entomology No. 234; two from *Aristotelia absconditella* Walker, Nashville, Tennessee, and Fordsville, Kentucky; two from *Epiblema minutana* Kearfott, Whitesbog, Virginia, under Quaintance No. 12769; and collected specimens from Pennsylvania, District of Columbia, and New Jersey; and a large number of reared specimens at the Gipsy Moth Laboratory, Melrose Highlands, Massachusetts, comprising series from *Archips fervidana* Clemens and *A. cerasivorana*

Fitch, which were taken at various Massachusetts and New Hampshire localities. I have also seen two specimens from Illinois in the collection of the University of Illinois.

42. BASSUS DISCOLOR (Cresson)

Microdus discolor CRESSON, Canad. Ent., vol. 5, 1873, p. 52.
Bassus brittoni VIERECK, Bull. 22, Conn. Geol. and Nat. Hist. Survey, 1917 (1916), pp. 227 and 229.

Type.—The type of *discolor* is in the Philadelphia Academy of Sciences; that of *brittoni* is in the agricultural experiment station at New Haven, Connecticut.

Very similar to *agilis*, but much more variable in color, the thorax varying from completely black to completely testaceous, and the head and abdomen also varying considerably; the head is usually mostly pale; and the pleura and abdomen are nearly always more closely granular and more opaque than in *agilis*; the ovipositor sheaths are a little shorter and the wings usually more uniformly and more distinctly tinted with brownish. In size *discolor* averages considerably smaller than *agilis*.

Face at least as broad as long; malar space about half the eye height; third segment of labial palpi minute; elevation between the antennae very low, not so pronounced as in *agilis;* antennae usually 34 to 38 segmented slender, even the apical segments elongate; thorax rather narrow; parapsidal furrows impressed, usually finely foveolate; furrow in front of scutellum pitted; propodeum closely rugose, without carinae; propleura entirely finely granular, with a few rugae anteriorly; mesopleura usually minutely granular or coriaceous below and with a finely foveolate longitudinal furrow; metapleura closely granular and opaque; hind coxae also granular and opaque; second cubital cell very small, triangular, petiolate; abdomen more slender than is usually true in *agilis;* the first tergite much longer than broad, closely strongly granular and opaque; the second entirely and usully the third except at apex also granular and opaque; ovipositor sheaths about as long as the propodeum and abdomen combined. Head mostly testaceous, with the frons vertex, and occiput usually more or less black; thorax black to testaceous, all degrees of variation occurring; legs testaceous; the hind femora rather broadly black at apex above; the hind tibiae not paler than their femora and with a more or less distinct blackish annulus near base, and the apex broadly blackish; hind tarsi blackish; wings a little tinted with brown; abdomen testaceous, more or less marked with blackish; the first tergite is sometimes partly blackish, and the third and following are usually more or less black above, but nearly always pale laterally. Length, usually 3 to 4 mm.

This characterization is drawn from the following material: The types of *discolor* and *brittoni*—six specimens in National Museum from

Illinois; Iowa; Anglesea, New Jersey; Nashville, Tennessee; and Canada; and two specimens in the collection of the University of Illinois—one from New Orleans, Louisiana, and one from Algonquin, Illinois.

SPECIES OF BASSUS NOT INCLUDED IN THE KEY

BASSUS RUGAREOLATUS Viereck

Bassus rugareolatus VIERECK, Bull. 22, Conn. Geol. and Nat. Hist. Survey, 1917 (1916), pp. 228 and 229.

Type.—In the agricultural experiment station at New Haven, Connecticut. It is in poor condition, the abdomen being missing and the antennae broken. The label indicates that the specimen is a male.

Because of the condition of the type and the unsatisfactory original description, I have considered it unwise to place this species in the key. It appears to be most similar to *erythrogaster;* but the malar space is longer than in that species and the face about as long as broad; also the hind trochanters are black and the propodeum is more strongly rugose. The ocell-ocular line is less than twice the diameter of an ocellus; the vertex rather flat; third segment of labial palpi longer than broad; parapsidal furrows shallow, smooth, most sharply impressed anteriorly; mesopleural furrow polished: hind femora and tibiae rather short and stout. Head and thorax black, the metapleura slightly reddish; anterior and middle legs mostly black; hind coxae and femora red, their trochanters, tibiae, and tarsi black; wings infuscated.

These brief notes are based on the type which is from New Haven, Connecticut.

BASSUS QUEBECENSIS (Provancher)

Microdus quebecensis PROVANCHER, Natural Canad., vol. 12, 1880, p. 178.

Type.—In the Museum of Public Instruction at Quebec, Canada.

On the basis of the original description and notes made on the type by S. A. Rohwer, this species appears to be *laticinctus* Cresson, and I have little doubt that is that species. However, because of certain slight differences indicated by Mr. Rohwer, such as the presence of converging furrows from the lateral ocelli to the base of the antennae, an unusually long scape which is "as long as the second and third antennal segments," and the presence of a "poorly defined petiolate areola" on the propodeum, I have thought it better not to synonymize the species with *laticinctus* at present.

?BASSUS VERTICALIS (Cresson)

Microdus verticalis CRESSON, Trans. Amer. Ent. Soc., vol. 4, 1872, p. 182.

I have been unable to locate the type of this species, and since the original description is not sufficiently distinctive, *verticalis* has not

been included in the key to species. Cresson stated that "this may be the female of *nigriceps*." But the type of his *Microdus nigriceps* is a female and belongs to *Crassomicrodus*. The longer ovipositor ascribed to *verticalis*, combined with other characters mentioned in the description, indicates that the species belongs in the genus *Bassus*.

HOST LIST

Host	Parasite
Acrobasis betulella Hulst	*Bassus calcaratus* (Cresson).
Acrobasis caryivorella Ragonot	*calcaratus* (Cresson).
	acrobasidis Cushman.
Acrobasis, species	*acrobasidis* Cushman.
Ancylis comptana Froelich	*annulipes* (Cresson).
Archips cerasivorana Fitch	*agilis* (Cresson).
Archips fervidana Clemens	*agilis* (Cresson).
Archips rileyana Grote	*agilis* (Cresson).
Aristotelia absconditella Walker	*agilis* (Cresson).
Carpocapsa ninana Riley	*ninanae* Muesebeck.
Carpocapsa pomonella Linnaeus	*carpocapsae* Cushman
Coelostathma discopunctanum Clemens	*annulipes* (Cresson).
Coelcophora leucochrysella Clemens	*coleophorae* Rohwer.
Epiblema minutana Kearfott	*agilis* (Cresson).
Eucosma desertana Zeller	*bicolor* (Provancher).
Eulia velutinana Walker	*cinctus* (Cresson).
Isophrictis, species	*buttricki* Viereck.
Lixus scrobicollis Boheman	*simillimus* (Cresson).
Mineola vacinii Riley	*immaculatus* Gahan.
Mompha stellella Busck	*gibbosus* Say.
Papaipema nitela Guenee	*gibbosus* Say.
Phthorimaea glochinella Zeller	*gibbosus* Say.
Phthorimaea operculella Zeller	*gibbosus* Say.
?Phthorimaea striatella Murtfeldt	*immaculatus* Gahan.
Pithinolophus indentata Dyar	*annulipes* (Cresson).
Psilocorsis, species	*calcaratus* (Cresson).
Pyrausta nubilalis Huebner	*agilis* (Cresson).
Pyrausta pertextalis Lederer	*sanctus* Say.
Tmetocera ocellana Schiffermueller	*laticinctus* (Cresson).

EXPLANATION OF PLATES

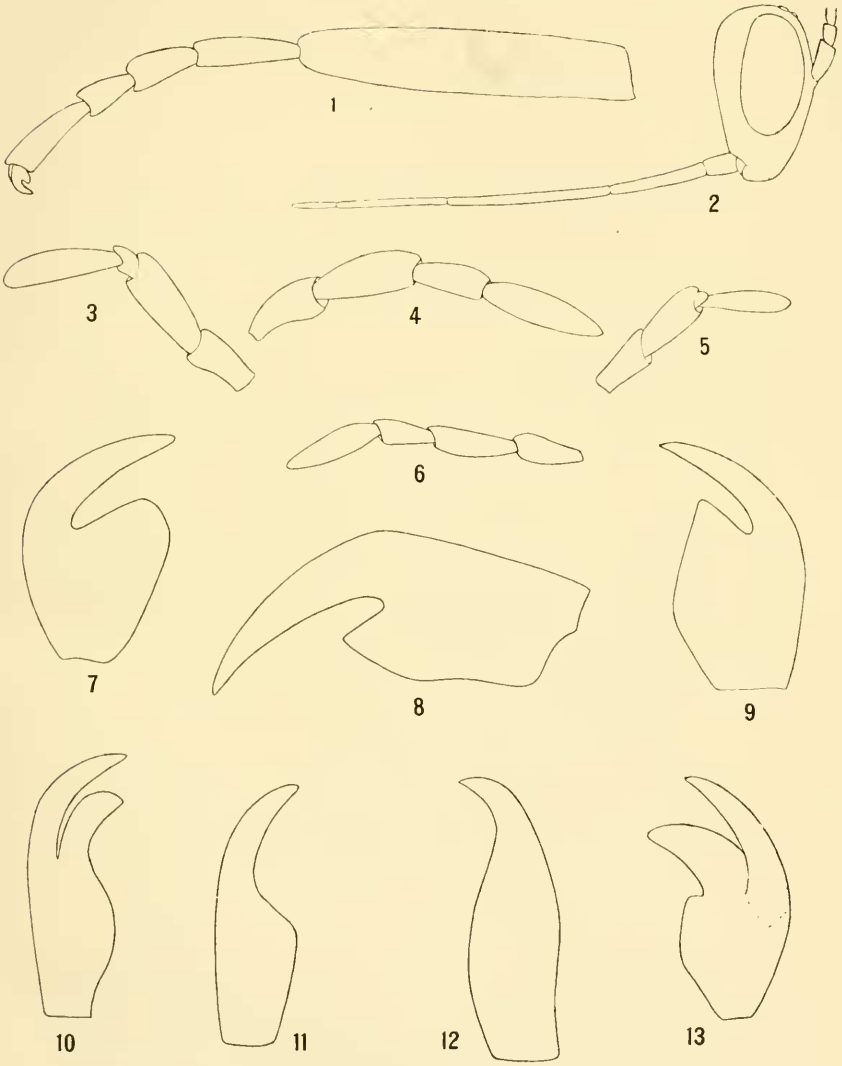
The drawings on Plate 1 are by the author. The photographs on Plate 2 were taken by Mr. C. E. Hood, of the Bureau of Entomology.

PLATE 1

FIG. 1. *Agathirsia thoracica.* Posterior tarsus.
2. *Aenigmostomus longipalpus.* Lateral view of head showing the long beak formed by the modified maxillary palpi.
3. *Bassus sanctus.* Labial palpus.
4. *Bassus spiracularis.* Labial palpus.
5. *Bassus calcaratus.* Labial palpus.
6. *Bassus nigripes.* Labial palpus.
7. *Bassus texanus.* Claw of anterior tarsus.
8. *Agathirsia thoracica.* Claw of anterior tarsus.
9. *Earinus limitaris.* Claw of anterior tarsus.
10. *Zelomorpha arizonensis.* Claw of anterior tarsus.
11. *Aenigmostomus longipalpus.* Claw of anterior tarsus.
12. *Crassomicrodus divisus.* Claw of anterior tarsus.
13. *Bracon montrealensis.* Claw of anterior tarsus.

PLATE 2

FIG. 14. *Bracon vulgaris.* Anterior wing.
15. *Agathirsia testacea.* Anterior wing.
16. *Bassus simillimus.* Anterior wing.
17. *Bassus spiracularis.* Anterior wing.
18. *Bassus simillimus.* Posterior wing.
19. *Bassus spiracularis.* Posterior wing.
20. *Bassus calcaratus.* Anterior wing.
21. *Earinus limitaris.* Anterior wing.
22. *Aenigmostomus longipalpus.* Anterior wing.
23. *Crassomicrodus divisus.* Anterior wing.
24. *Bassus sanctus.* Anterior wing.
25. *Zelomorpha arizonensis.* Anterior wing.



DETAILS OF BRACONID FLIES

FOR EXPLANATION OF PLATE SEE PAGE 71